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ELECTRIC RAILWAY TRACTION

A Supplement illustrating and describing developments in Electric Railway Traction is presented with each copy of this week's issue.

The Primary Condition for Prosperity

WHAT constitutes prosperity? The question is prompted by an address on measures for prolonging prosperity delivered by Sir Robert Kindersley, a Director of the Bank of England, at a luncheon of the Industrial Co-Partnership Association on December 2. Sir Josiah Stamp, who presided, said he was glad there had been no further delay in dealing with the subject, which, indeed, Sir Robert Kindersley was only just in time to catch by the tail. Sir Robert himself remarked that prosperity now looked like running away, but mentioned certain essentials for its continuance: international peace, a reasonable standard of life, the maintenance of prices of raw materials, and the confidence of peoples in the finances of their governments. He added the curious comment that an improved standard of life cannot come while countries are spending vast sums on armaments; and it was this which raised the query in our mind as to what was prosperity. Here in Great Britain anyway the increase in paid employment on armaments, enabling so much more money to be spent on consumable goods and services, results in an improved standard of life until inflated prices neutralise the benefit. This is at least comparative prosperity, for the people prosper more than when their incomes are so low that they as consumers cannot provide adequate markets for themselves as producers. It seems reasonable, then, to suppose that the primary condition for a continuance of prosperity would be to increase individual incomes in such a way that prices were not forced up thereby.

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Non-Stop Holiday Trains

There is a curious disinclination on the part of the public to travel by "relief" trains; it is as if the suspicion prevailed that anything other than the train shown in the timetable at any particular hour is likely to be of inferior quality. The result is that at periods of week-end and holiday pressure there is seldom an equal loading of all the trains provided, but passengers tend to flock to the regular expresses, which get uncomfortably overcrowded, whereas the relief portions often contain unoccupied space. As already recorded in our issue of November 26, the London & North Eastern Railway is making a determined attempt this Christmas to break through the tradition. On both December 23 and 24 a relief train to the down Flying Scotsman is to run non-stop over the 392¾ miles from King's Cross to Edinburgh on the summer 56·1 m.p.h. schedule of 7 hr.; on December 23 there will be three and on December 25 four non-stops over the 268¼ miles from London to Newcastle; while Christmas Eve will also see four non-stop trains from King's Cross to Darlington, 232¼ miles away. In addition to providing comfortable and undisturbed journeys for the long-distance passengers, and, it is hoped, a better distribution of patronage over all the trains provided, this arrangement is likely to facilitate operation by preventing the occupation of platforms at important junctions *en route* by a succession of portions of the same train—a fruitful and cumulative source of delay at holiday times. To some extent the same plan is followed by all the main line railways at holiday times, but this L.N.E.R. experiment is easily the most ambitious on record.

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The Week's Traffics

Passenger train traffics contributed £12,000, general merchandise £53,000, and coal £62,000 towards the combined increase of £127,000 shown by the four main line railways for the past week, which compares with an increase of £153,000 for the previous week. Under each heading the gain is smaller than for the earlier week, coal showing a difference of £20,000, and the two other classes a fall of £3,000 each. For the year to date the aggregate earnings of the four companies amount to £151,499,000, an increase of £6,484,000 or 4·47 per cent.

	48th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec	%
	£	£	£	£	£	
L.M.S.R. ..	+ 6,000	+ 21,000	+ 21,000	+ 48,000	+ 2,476,000	+ 4·22
L.N.E.R. ..	+ 2,000	+ 26,000	+ 24,000	+ 52,000	+ 2,101,000	+ 4·92
G.W.R. ..	—	+ 4,000	+ 9,000	+ 13,000	+ 1,230,000	+ 5·06
S.R. ..	+ 4,000	+ 2,000	+ 8,000	+ 14,000	+ 677,000	+ 3·50

London Transport receipts for the past week show a surprising fall of £15,100, which may partly be attributed to less coach travel in the unfavourable weather conditions. Mersey Railway traffics, though down £87 on the week, are £4,655 up for the year to date. On the Great Northern Railway (Ireland) the aggregate decrease is now £2,500, and on the Great Southern £18,346.

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The Taltal Railway in 1936-37

The traffic of the Taltal Railway of Chile consists mainly of nitrates, and the results obtained by the company are dependent largely on this traffic. Some 69,102 tons were carried in 1936-37, as compared with 87,309 tons in the previous year, a reduction of 18,207 tons. This may be compared also with the financial year 1929-30, when no

fewer than 160,300 tons of this commodity were carried. On the other hand, 22,927 tons of gold and copper ore were carried in 1936-37, as against 14,764 tons in the previous year. Gross receipts were higher by £1,705 or 4 per cent., and working expenditure increased by £701 or 1·85 per cent., net receipts being therefore £1,004, or 20·74 per cent., higher. Working costs were augmented by the compulsory increases in salaries and wages and other social legislation. The results of working were as follow:—

	1936–37	1935–36
Passengers	18,072	14,666
Public goods, tons	122,498	130,457
Average fare	1s. 4·2d.	1s. 6·2d.
Average receipt, per ton ..	6s. 2·2d.	6s. 1·9d.
Train-miles	106,832	109,864
Operating ratio, per cent. ..	90·64	88·67
	£	£
Passenger receipts	1,222	1,111
Goods receipts	37,776	40,051
Gross receipts	41,015	42,720
Expenditure	37,178	37,879
Net receipts	3,837	4,841

Adding to the net earnings the interest on investments, £5,868, the balance of income tax account, £5,039, and balance brought forward, £6,342, with a small adjustment for loss on exchange, there is a balance available of £21,080, out of which a dividend of 1 per cent. is paid, the same as last year, with £9,080 carried forward. For some years past nothing has been appropriated to the renewals fund, but this fund still stands at the substantial figure of £125,394. The strictest economy has been exercised in respect of expenditure on renewals, only work of an urgent character necessary for traffic requirements being carried out.

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Italian State Railways in 1936-37

Provisional results of the Italian State Railways for the financial year 1936-37 show that for the first time in several years, gross ordinary expenditure, 3,857 million lire, was nearly covered by total receipts from traffic, about 3,700 millions. During the previous year the corresponding figures were 3,823 and 3,156 million lire respectively. Both passenger and goods traffic shared in the increase in total traffic shown by these figures. The number of passengers carried was 98,531,000 as compared with 97,536,000 in the preceding financial year, and goods, totalling 50,913,000 tons, showed a considerable increase over the figure of 47,089,000 tons for 1935-36. The length of line in operation on July 31, 1937, was the same as a year previously, namely, 16,890 km. The length of electrified lines had been increased from 3,258 km. to 3,912 km., and, in addition, 542 km. were in process of being electrified. Due to extension of electrification consumption of coal was reduced to 1,796,000 tons as against 1,943,000 tons in 1935-36, and 2,258,000 tons in 1934-35; the consumption of electric power, increased correspondingly from 612,372,000 kW. in 1935-36 to 750,935,000 kW. in the year just closed.

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The Ownership of the Rigi Railway

In the article on the electrification of the Rigi Railway which was published in our *Electric Railway Traction Supplement* for November 12, mention was made of the fact that the Staffelhöhe—Kulm section is owned by the Arth-Rigi Railway. This peculiar ownership situation was due to the fact that before the Swiss Federal Law of December 23, 1872, was passed, authority to build railways was granted by the Cantons, and the Rigi Railway Company's concession, granted on June 9, 1869, by the Canton of Lucerne, was for a line from Vitznau to the frontier of the Canton of Schwyz, which is at Staffelhöhe. On October 16, 1869, the company applied to the Canton of Schwyz for permission to extend the line from the frontier to Kulm, but this was refused. The Schwyz people wanted a line of their own, and granted a concession to a group of Arth citizens to build a line "from the Lucerne-Schwyz cantonal frontier above Kaltbad to Rigi—Kulm and thence on the north side of the Rigi to the valley bottom at Arth-Goldau." The Staffelhöhe—Kulm section was built first, and handed over to the Rigi Railway on lease on the basis of 60 per cent. of the gross receipts, so the whole line from Vitznau to Kulm was completed before the Arth—Rigi line was begun. The Staffelhöhe to Kulm section was opened on June 27, 1873, and the Arth-Goldau to Kulm line on June 4, 1875. Thus the Arth-Rigi Railway owns not only a track parallel to its own which is used exclusively by another railway, but also a portion of line in another direction, namely, Staffelhöhe—Staffel, which is part of a competitive route.

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Coal Control and Quotas

Coal traffic at this part of the year naturally attracts special attention from L.M.S.R. commercial representatives seeking to fulfil and surpass their quotas. In the December issue of *Quota News*, Mr. Ashton Davies, Chief Commercial Manager, L.M.S.R., therefore devotes a timely article to explaining the repercussions upon this valuable business of controlled production and sale in the coal industry. Selling agreements naturally affect the problem of distribution, and Mr. Ashton Davies refers to the practice of central selling by groups of collieries through one selling agency. This has led to a pooling of privately-owned wagon stocks in some districts, a move which is welcomed as a contribution towards reducing the complications of sorting arising from the fact that almost 90 per cent. of the rail-borne coal traffic in England and Wales is carried in private wagons requiring return to individual owners. Dealing with competition, Mr. Ashton Davies records the serious inroads upon rail coal traffic of coastwise transport. This factor has been increased by collieries in Scotland and on the North East Coast compensating for loss of export trade by extending their selling areas to districts hitherto served by Midland coalfields using rail transport.

* * * *

A Scheme for Smoke Deflection

The widespread use of locomotive smoke deflectors nowadays is, of course, a measure taken primarily for the convenience of the engine crews. In early days, however, when open-sided carriages and completely open wagons were commonplaces of lower class railway travel—and even roof seats were not unknown—such provision would surely have been much appreciated by passengers. In November, 1837, John Herapath, the spirited editor of *The Railway Magazine* said "some plan must ere long be adopted to prevent the nuisance arising from the steam and small particles of coke issuing from locomotive chimneys. Outside travelling is all but impossible." He went on to describe how, even when trains went under any archway, if the wind were blowing obliquely, steam (*sic*) mixed with coke entered at the windows to a very offensive extent "by reflection from the sides of the archways." His solution was to turn the chimneys to point backwards under the carriages, which were to be fitted underneath with a series of thin overlapping tin plates to prevent the smoke ascending until it emerged at the back of the train. Optimistically he concluded: "We throw out the hint to set others going, and shall rejoice if it has an effect."

Streamline Success

If any proof were needed that high railway speed in Great Britain is both practical and popular, the figures given on page 1036 of this issue concerning the first two years' working of the L.N.E.R. Silver Jubilee would certainly provide it. On the operating side is the fact that average lateness of arrival of the Silver Jubilee at the end of a 4-hr. journey, including delays from all exceptional causes, such as breakdowns of other trains, fog, and bad weather, has been only a shade over 2 min. in 1,034 journeys. In the course of running 277,370 miles, of which 162,030 miles have been scheduled at an average of 75 m.p.h., on only one occasion has it been necessary to stop the Silver Jubilee because a coach had developed a hot box, although there have been several similar locomotive casualties; and apart from week-ends and brief holiday periods at Christmas and Easter, the original train has been absent from duty on only three separate return trips in all in a period of 105 weeks. On the locomotive side an average coal consumption of 37·6 lb. per mile is remarkably low in relation to the high speeds run. As regards patronage, the public has signified its approval of the facilities provided by loading the train practically to capacity on the whole of the down journeys, and very nearly so coming up; it has furthermore shown no disinclination to pay a supplement for speed, for the train has collected no less than £25,780 in supplementary fares during this period.

* * * *

The First Air-Conditioned Car in China

China is the latest country to adopt air-conditioned railway travel, a luxury lounge car having recently been built and placed in service by the British Section of the Kowloon—Canton Railway complete with full air-conditioning on the American Trane Company's system. This luxuriously appointed car seats 31 passengers in movable armchairs. One of its most remarkable features, however, is that no supplement is added for travel in it, the ordinary first class fare—which works out at only just over ½d. a mile—being charged; to reserve a seat beforehand the sum of 7½d. is payable. Thanks to the efficient insulation of the coach, which is illustrated and described on pages 1022-3, the cost of ice for a 222-mile round trip from Kowloon to Canton and back, with a 5-hr. wait in Canton, is only about 15s., the consumption being approximately 3,000 lb., at about 11s. 3d. a ton. To give some idea of the efficacy of the air-conditioning, it may be mentioned that, with an outside temperature of 88°-90° F., and humidity 85 per cent., the temperature maintained in the car, with a complement of passengers, has averaged 75° with a relative humidity of only 60 per cent. In addition to helping to insulate the car body, the special construction of the floor has succeeded in damping out vibration, with the result that the running of the coach is almost silent. Great credit is due to all concerned on the British Section of the K.—C.R. for the enterprise displayed in the design, construction, and operation of this pioneer car.

* * * *

A Name Wanted for a Signal

With the introduction of the floodlit type of shunt signal, in which a coloured bar is seen on a white background plate by day or night, the need of a new and simple name for it has arisen. Such signals are sometimes called disc signals in descriptions of various installations, but we think this is a mistake, as a disc signal is surely one in which a disc, or target, disappears or is replaced by another of different appearance when the signal aspect changes. The floodlit shunt signal gives its indications by the position, horizontal or inclined, of the coloured bar, which represents a signal arm, and its aspects are therefore semaphoric in character. The so-called disc—the white metal plate—is provided only to make the bar more distinctly visible. Indeed, the signal is a derivative of the banner signal, so named because in the first designs the arm was a light framework covered with coloured fabric; and as far as general appearance goes the two kinds of signal are substantially similar, the bar alone, by its position, conveying the message to the driver. The German name for such signals, *Balkensignal* (bar signal), certainly conveys the idea of them better than "disc signal," which seems unsatisfactory to us and liable to lead to misunderstanding.

* * * *

Exhaust Steam Injectors

We note that in the discussion which followed the reading of Mr. E. C. Noble's paper on "The Economics of Locomotive Engineering" to the South American Centre of the Institution of Locomotive Engineers, due regard was paid by one of the speakers, Mr. F. R. Bennett, to the economy and other advantages of the exhaust steam injector. This simple apparatus has the advantage of economy, in that its capital installation cost is about one-third of that of any other type of feed water heater, and the depreciation charges should be in the same ratio. Mr. Bennett remarked that the exhaust injector is probably the simplest, lightest, and most efficient method of utilising exhaust steam in a locomotive. In principle, it is similar to the live steam injector, and the exhaust steam, on being condensed in the feed water, not only serves to heat the latter, but also to force it into the boiler. In practice, the exhaust injector delivers feed water to the boiler at temperatures as high as 220° F., while the quantity of feed delivered may be varied by 50 per cent., so that a steady water level can be maintained under all conditions of locomotive working. A further point of interest, especially in bad water districts, is that 10 per cent. of the feed water delivered to the boiler is pure distilled water, being the quantity of exhaust steam condensed. We can confirm the statement that on the footplate the steadiness of the steam pressure gauge, when the exhaust injector is in action, is very noticeable compared with the variations seen when the live steam injector is working; and in addition, the fireman's work in maintaining the steam is lessened.

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Tickets for Christmas

Mr. S. Claus, who, as has been recorded on numerous occasions, assumes temporary control of transport (gifts and good wishes section) at the Christmas season, will enter upon his duties as usual in the period beginning midnight, December 24. Mr. Claus, whose antecedents are obscure but of whose good taste there are no two opinions, desires it to be known that for the fourth year in succession he will be distributing railway tickets to deserving applicants, by arrangement with the British main-line railways and joint lines. This scheme was inaugurated on the L.M.S.R. in 1934, and extended to the other railways in the following year. The arrangements for this Christmas are that tickets available for outward journeys between any two stations for the period December 11 to January 8, inclusive, are being issued in advance, and may be sent by purchasers to their prospective guests at the Christmas and New Year season. If desired, the railways will themselves forward the tickets to those who are to use them, enclosing them in a greeting card inscribed "come and join our party." Intending donors will be relieved, painlessly and sympathetically, of the necessary monies at any booking office. Would-be recipients should apply at the nearest chimney.

XUM

Through Rates and Irish Charges

THE Irish Free State Railway Tribunal announced on December 3 that it had decided to authorise the Great Southern Railways of Ireland to increase all railway charges, both passenger and goods, by 5 per cent. to enable the company to meet the increase in its working expenses.* This decision is estimated to bring in an extra £100,000 to the company. It will also enable the present arrangements in connection with through rates and fares between Great Britain and Ireland to be placed upon a more satisfactory basis than is at present possible. The difficulties connected with this problem were discussed in THE RAILWAY GAZETTE of October 1, but since that article was prepared, arrangements were made for the 5 per cent. increase to be applied to all through rates and fares between Great Britain and Northern Ireland, as from October 1, with the exception of ten stations situated on the border between Northern Ireland and the Irish Free State, including such places as Ballybeg, Cavan, Kells, and Sligo. The charges to these stations were dealt with, as explained below, in order not to prejudice the position in the Irish Free State. The railways in Southern Ireland, pending the decision of the Irish Free State Railway Tribunal, were unable to agree to a similar increase being applied to all through rates between Great Britain and places in their territory, but arrangements were made to add certain fixed sums to the throughout charges, representing the average increase between the stations in Great Britain and the Irish ports, leaving any increase in respect of the distance from the ports to the interior stations to be dealt with at a later date. These fixed sums were also added to the through rates and fares by all routes to the ten border stations in question. As from January 1, 1938, however, it will now be possible to regularise the position by the application of the 5 per cent. increase generally to through rates and fares.

* * * *

Sudan Railways

THE Sudan Railways have a route mileage of 2,020 on the 3 ft. 6 in. gauge, and also include the operation of river services over a distance of 2,325 miles, extending to Shellal in the north, where connection is made with the Egyptian State Railways, and to Juba in the south, whence a 100-mile motor service connects with the Kenya & Uganda Railways. The main railway system of 576 miles runs southwards from Wadi Halfa to Abu Hamed, Atbara, and Khartoum. There is railway communication between Atbara and Port Sudan on the Red Sea where a modern harbour has been constructed. South of Khartoum there are railways connecting at Sennar with the lines to Gedaref and Kassala, which join the Port Sudan line at Haia. In addition, the administration operates Port Sudan Harbour, power stations, hotels and catering services, and miscellaneous services.

All the services together brought in for 1936 a gross revenue of £E.2,621,834 and a net revenue of £E.1,250,153, which compare, respectively, with £E.2,511,827 and £E.1,195,194 for 1935. Profits from steamer services in 1936 amounted to £E.44,557, against £E.37,325 for 1935; from Port Sudan Harbour to £E.87,092 against £E.82,382; and from hotels and catering to £E.3,332 against £E.4,520. The increased receipts reflect the improved trade conditions. There was a satisfactory grain harvest, and the cotton crop was again good, although the total tonnage of cotton and cottonseed exported was slightly less than the record of 1935. The tonnage of sesame exported constituted a record, and there was a good increase in the export of gum, garad, ground nuts, hides and skins, senna mecca, and water melon seeds. Import tonnage was a little lower than 1935 but much higher than in any year previous to 1935. Figures in the accompanying table refer to railway services only:—

	1936	1935
Route miles	2,020	2,021
Passengers	967,653	784,246
Goods tonnage	913,054	914,652
Train-kilometres	3,179,933	3,150,446
Operating ratio, per cent. ..	46·5	46·6
	£ E.	£ E.
Passenger receipts	234,509	206,122
Goods receipts	1,693,532	1,649,529
Total revenue	2,066,973	1,995,352
Working expenses	960,925	929,488
Net profit	1,106,048	1,065,864

Four classes of passengers are carried on the railways and three on the steamers. A general scaling down of passenger fares was effected on October 1, 1936, when a new and simplified fares tariff was issued. Third class river fares have been lowered to the level of fourth class railway fares. Reference is made in the report to the 4-6-4 + 4-6-4 Beyer-Garratt locomotives which were described and illustrated in THE RAILWAY GAZETTE of February 26, 1937, at page 375. The low axle load of these engines permits of their working over the lightest main line track on the system. Two 300 h.p. diesel-electric shunting engines of British make were received towards the end of the year under review. A model railway has been installed in the traffic training school at Atbara by the Engineering Department.

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New South Wales Government Railways

ACCORDING to the report of the New South Wales Government Railways for the financial year 1936-37, which we have received from Mr. T. J. Hartigan, Commissioner for Railways, the improvement noted last year in the receipts of the railways has continued, and the results for 1936-37 showed a profit for the first time in several years. Total earnings were higher by £862,915, or 5·09 per cent., while working expenses increased by only £507,252, or 4·28 per cent., so that the balance of profit on operations was £355,663, or 6·97 per cent., greater, giving a return on capital of £3 15s. 7d. per cent., as against £3 11s. 6d. in the previous year. The Government again contributed £800,000 towards losses on working country developmental lines, although the actual loss incurred on non-paying lines (after providing for working expenses, interest, and exchange) exceeded that sum by £1,037,619. Adding the Government contribution to net earnings gives £6,261,174, from which is deducted for statutory charges £6,232,777 (including £5,444,125 loan interest) leaving a surplus of £28,397, compared with a deficit in 1935-36 of £698,262, and a deficit also in 1935 of £1,283,511. Earnings from first class travel declined by £540, while those from second class and workmen's tickets increased by £154,130 and £36,162, respectively, over the previous period, and the total passenger journeys exceeded those of the year before by 6,694,536, establishing a new record. Parcels and mails brought in £7,963 more, and the revenue from goods traffic, including livestock, was £9,660,767, an improvement of £505,846. Of the increase of £507,252 on the expenditure side, £230,170 was due to increases in the Federal basic wage, the State living wage, various award provisions, and the operation of the Public Services Salaries Act. Expenditure on betterments, renewals and partial renewals of rolling stock, track and other assets, was

* See also brief announcement to this effect in our news columns on page 1039.

£1,113,625, and £218,686 was written off capital account for condemned rolling stock and other displaced assets. The operating ratio is the lowest since 1918-19, when the figure was 69·33 per cent. The principal results of working compare with those of the preceding year as follow:—

	1936-37	1935-36
Miles open	6,124¼	6,124¼
Train-miles	28,547,207	27,701,005
Passengers	177,837,265	171,142,729
Goods and coal, tons	13,852,194	13,039,314
Operating ratio, per cent.	69·35	69·89
	£	£
Passenger receipts	5,622,929	5,433,176
Goods and coal receipts	8,473,304	8,099,410
Total earnings	17,816,496	16,953,581
Working expenses	12,355,322	11,848,070
Net earnings	5,461,174	5,105,511

The Sydney—Newcastle express has been modernised, and its timing for the 104 miles over difficult country reduced to 2½ hr. By welding long lengths of track and replacing the 80-lb. rails with 107-lb. rails the line has been strengthened for express speeds. Work on the Sydney—Brisbane line is still in progress, to fit the track to carry heavy high-speed express trains. The first of a small fleet of air-conditioned trains drawn by diesel engines is ready for service, to supplement the restricted steam trains service in far inland districts. The first diesel train will run between Parkes and Broken Hill, a distance of 400 miles, at a relatively high speed. The stock of railcars will be augmented by four up-to-date petrol-driven streamlined cars, which will, when occasion requires, haul one or two trailer cars. The construction of a number of railbuses is also in hand. A short section of track from Clyde to Rosehill was electrified, and a new Caves Express (between Sydney and Mount Victoria) was put into commission. Notwithstanding the general increase in speeds and acceleration, the reliability of locomotive operation is noteworthy, and improved percentages of punctual running have been achieved in both passenger and goods services. With a locomotive mileage for the year of 27,533,000, a mileage of 56,536 was run per casualty, and 19,080 per failure. Delays of over 5 min. to passenger trains and 10 min. to goods trains are regarded as casualties, and when an engine has to be changed it is classed as a failure. Engine-miles per engine for the year were 30,322. The length of line partly renewed by re-railing was 104 miles, by re-sleepering 271 miles; 1,213 miles were reballasted. Thermit welding was continued, 40 miles of track being treated by this method. The comprehensive scheme of alterations at Newcastle was completed. The average number of staff employed throughout the year was 41,123, including 6,617 on works not chargeable to working expenses.

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Railway Aids to Lecturers

THE advent of winter marks the re-opening of lecture society activities throughout Great Britain, and the main line companies are experiencing their usual heavy demand for slides or films illustrative of travel or railway activities. The companies have realised for many years the publicity value of lantern slides, and have all maintained fairly extensive collections of views of beauty spots and places of historical interest, which, with appropriate notes, are loaned free of charge to lecturers at such societies and kindred organisations. In recent years the companies have collaborated in the preparation of five sets of lantern slides under the headings of "The Railways of Great Britain"; "British Railway Locomotives"; "Railway Wonders of Great Britain"; "Trains, Tracks, and Travel"; and "British Railway Docks." These, together with a descriptive booklet enabling the lecturer to give an interesting running commentary, are issued on loan through the British Railway Press Bureau, free of charge including conveyance over the main line railway systems, to lecture societies, schools and similar organisations, and are in constant demand. The companies have also prepared jointly, and loan through the bureau on similar terms, a silent 16-mm. film entitled "Pathways of Perfection," portraying the principal express train of every company and showing the scenic features of its route.

Apart from these combined efforts, the L.M.S.R. has developed film activities on its own account to a considerable extent, and has now prepared over twenty 16-mm. films covering the principal places of holiday and scenic interest served by the system. Film libraries have been established in London and at a number of important provincial centres, from which the films are distributed to local societies. The company now possesses three travelling film units, comprising an operator and a man responsible for the exhibition arrangements; in fact, for an audience of not fewer than fifty persons, the L.M.S.R. will provide the films for a complete programme, as well as the lecturer. These film activities also embrace the production of educational films of general interest dramatising various aspects of railway working, as well as the production of instructional films for exhibition solely to the staff.

The L.N.E.R., in addition to lantern slides, possesses a series of nine 16-mm. films of travel and general interest covering such districts as Yorkshire, Scotland, the Norfolk Broads, London, and the Western Highlands. The Southern Railway has twelve sets of lantern slide lectures available for loan, and six 16-mm. films bearing such attractive titles as "Sunrays on the South Coast," "The Gateway of the World—Southampton Docks," "South African Fruit," and so on. The Great Western Railway has concentrated mainly on the production of lantern slides, but short scenic films of areas served by the line have been issued through cinemas. Films dealing with the company's docks activities and issued in connection with its centenary celebrations have had a wide circulation, and it is understood that a film dealing with the Duchy of Cornwall is in course of preparation.

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Bengal-Nagpur Railway

THE Bengal-Nagpur system includes two principal main lines on the 5 ft. 6 in. gauge, one running west from Howrah (Calcutta) to Nagpur, where a junction is made with the Great Indian Peninsula Railway to Bombay, and the other southwards from Khargpur (72 miles west of Howrah) by the east coast to Waltair, where connection is made with the Madras & Southern Mahratta system, and to Vizagapatam. Raipur on the Nagpur line is connected with Vizianagram on the east coast line by a broad gauge chord. Between Howrah and Khargpur the line is double-tracked. Gross earnings for the year ended March 31, 1937, decreased by Rs. 24,39,727 or 2·84 per cent. This is largely set off by a considerable saving in working expenses of Rs. 12,58,441, with the result that net earnings are less by Rs. 11,81,287 or 4·47 per cent. than in the preceding year. This is partly attributable to the strike of over two months' duration in the Mechanical Department. The net earnings failed by Rs. 10,88,451 to meet interest charges, and there are, consequently, no surplus profits to divide between the Government and the company. For the previous year the deficit was Rs. 8,60,949, and there have been no surplus profits since the year 1927-28. Stockholders receive 4 per cent. for the year under review, the same as for the five previous years, of which 3½ per cent. comes from guaranteed interest and

10s. from reserve. After providing for this dividend the balance of the reserve will be approximately £19,000. Some operating figures are compared in the accompanying table:—

	1936–37	1935–36
Mean mileage worked	3,268	3,268
Train-miles	14,619,381	14,667,609
Passengers	18,565,453	19,349,679
Goods, tons	15,812,176	16,756,605
Operating ratio, per cent.	69·74	69·22
	Rs.	Rs.
Passenger receipts	1,51,62,617	1,60,09,928
Goods earnings	6,33,53,736	6,50,91,165
Gross earnings	8,33,72,068	8,58,11,795
Expenses	5,81,41,090	5,93,99,531
Net earnings	2,52,30,977	2,64,12,264

Passenger numbers decreased 4·05 per cent. and receipts 5·29 per cent. This traffic was affected by the strike. Fuel was down 519,564 tons and Rs. 8,22,554. There was a stoppage of work in some of the Bengal coalfields on account of excessive accumulation of water, and there were lower raisings of coal in the latter part of the year owing to shortage of labour in the mines. There was a lack of shipment orders and less demand from the Tata Iron & Steel Company. Under general merchandise there was a decrease of 273,456 tons and Rs. 8,90,546. In the previous year the dispatches of manganese ore were the heaviest on record. Lac, rice, and sugar produced better traffics in the year under review, but manganese, wrought iron and steel, and wheat brought in considerably less. In working expenses there were savings of 2·76 per cent. under maintenance of structural works, of 12·05 per cent. under maintenance of carriage and wagon stock, and of 0·43 per cent under maintenance and supply of locomotive power. Traffic expenses, however, increased by 3·81 per cent. and expenses of general departments by 2·13 per cent. Track renewals were curtailed. Locomotive expenses included a heavy outlay on conversion of a number of saturated locomotives to superheat. The increase in traffic expenses was largely due to extra pay and other charges to loyal staff during the strike, and conference hire and penalty charges incurred owing to the demand for wagons on all broad gauge railways exceeding the stock available, and to some extent to the slower movement of stock during the strike. Capital expenditure during the year amounted to £42,929.

* * * *

Railwaymen under Water

AMONG the 230,000 employees of the L.M.S.R. are 30 men who spend practically the whole of their working time under water. These are divers, employed chiefly at the company's docks (the L.M.S.R. is one of the largest owners of docks in the country), and for other work at the lakes (where the company operates steamer services), canals, and the foundations of railway bridges. One of the biggest tasks recently undertaken by L.M.S.R. divers was underwater work in connection with the erection of a new slipway at Lakeside for use by the steamers plying on Lake Windermere; In addition to their normal duties, these railwaymen divers are occasionally called upon by local authorities for the laying of underwater cables, gas and water mains, and reservoir work. When new ships are launched, too, they are employed by the builders to "sweep away" the timbers from underneath the vessels. One L.M.S.R. diver, working singlehanded, recovered 15 wagon loads of timber displaced during a launching ceremony. Most of the company's divers are recruited from among shipwrights.

Many exciting experiences have befallen these railway divers. Foreman Diver Douglas, of Barrow-in-Furness, had a narrow escape from drowning when working in a diving bell on the renewal of gate floor roller paths at Barrow docks. He had given orders for the bell to be lowered to begin work, but, instead of taking four minutes to reach a depth of 30 ft., it took only as many seconds. The clutch of the crane had failed, so that the brake was unable to hold the weight of the bell. The lifting gear had to be transferred to a hand-winch to pull up the bell. Another L.M.S.R. diver descended into a large petroleum tank full of crude oil in order to repair a leak. On another occasion, this same diver was rushed by special train to a West Cumberland mine to rescue some miners cut off by an inrush of water. Barrow docks will shortly be the scene of the next L.M.S.R. big diving job. The beam of the aircraft carriers which are being constructed by Vickers-Armstrongs Limited for the Government will necessitate the temporary widening of the harbour entrance by several feet before they can leave their berths, as they will be the biggest vessels that have been built at Barrow. To make this widening possible, certain iron castings will have to be removed, and a considerable portion of this work will be done under water by L.M.S.R. divers.

THE SOUTHERN RAILWAY COMPANY'S MARITIME CONNECTION WITH GUERNSEY.—The association of the Channel Islands with the London & South Western Railway (now merged into the Southern Railway) provides a long and interesting history, extending over a period of seventy-five years, during which time a passenger, mail, and cargo service to and from Southampton has been maintained regularly. According to an article appearing under the joint authorship of Messrs. C. N. Falla and C. J. Rawlinson in a recent issue of the *Southern Railway Magazine*, the L.S.W.R. acquired outright in 1862 the South Western Navigation Company, which itself had taken over in 1849 from the British Government a passenger, mail, and parcel service between Southampton and the Islands. Paddle steamers were first employed, but as traffic increased they were followed by single-screw and later twin-screw steamers. The latter were exceptionally fast vessels and during a succession of years, at times when the tides were favourable, they set up a number of records. The L.S.W.R. was originally the only company under Government contract to carry mails to the Islands. Today services between Southampton and Guernsey, &c., are operated principally by the turbine steamers *Isle of Jersey*, *Isle of Guernsey*, *Isle of Sark*, and the *Lorina*, which carry mails, passengers, and cargo; and by the cargo vessels *Haslemere*, *Fratton*, *Ringwood*, and *Minster*. In addition to the Southern Railway services from Southampton. regular sailings are also maintained by the G.W.R. from Weymouth. Although the two services are now conducted on a joint co-operative basis, there was formerly keen rivalry. In 1932 the two company's staffs on the Islands were amalgamated, Guernsey being placed under the control of the G.W.R. and Jersey under that of the Southern Railway. During the last 20 years or so there has been a remarkable increase in the export of agricultural produce from Guernsey. In 1913 the shipments *via* Southampton amounted to 1,317,617 packages, but in 1936 this had increased to 3,375,549 packages. In the latter year the produce shipped by G.W.R. and Southern Railway steamers amounted to 40,000 tons or 6,306,881 packages.

The bulk of this traffic consists of tomatoes. A large percentage of the Guernsey produce is grown in hot-houses which necessitates the importation of approximately 150,000 tons of Welsh anthracite coal annually. Last year 1,037 head of cattle were shipped in Southern Railway vessels from Guernsey. The Island is a much favoured holiday resort and in 1936 the number of passengers travelling there in Southern Railway and G.W.R. steamers aggregated 71,761. Of this total the S.R. carried 38,892.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Presentation to Sir Nigel Gresley

9, Stanhope Terrace, Lancaster Gate, W.2
December 7

To the Editor of The Railway Gazette

Sir,—On reading your report of the presentation proceedings at Marylebone, it is noticeable that, while Sir Nigel Gresley referred in generous terms to the help which he had received from members of his staff, and to the adoption of ideas from the Continent and America, he made no mention of the late Mr. Churchward or the G.W.R.

Surely it was only after the adoption of higher boiler pressure, long valve travel, and other Swindon features, that the Pacifics could be regarded as such successful engines?

Yours faithfully,
P. M. BROOKE-HITCHING

L.N.E.R. Locomotive No. 10000

November 27

To the Editor of The Railway Gazette

Sir,—I am much interested in the description given on pages 926-7 of your issue dated November 26, of the rebuilding of the L.N.E.R. locomotive No. 10000. I am, however, still not quite clear regarding the precise arrangement of the trailing wheels of the engine. The type is variously described as 4-6-4 and 4-6-2-2, and I note that on the drawing on page 927, the rearmost axle is marked "Bissel truck," and the one in front of it, "Cartazzi axlebox." This to me seems still further to complicate the matter, and I would very much like to know:—

(1) Which is the proper designation of the engine?

(2) Why the trailing wheels could not be built as a bogie?

Sir H. Nigel Gresley, I believe, insists that the engine is of the 4-6-4 type.

Yours faithfully,
EX-DISTRICT LOCO. SUPT.

[These points were raised at a meeting of the Institution of Locomotive Engineers during the discussion on Sir (then Mr.) H. Nigel Gresley's paper on "High Pressure Locomotives." Replying to various questions on the subject, the author stated that there was no room to put in a bogie at the trailing end of the engine, because the ashpan came so low. It was just above the axle, and the trailing axle was really a Bissel truck, whilst the axle in front of it was similar to that used on the Pacific engines. It was interchangeable, had a Cartazzi axlebox, and allowed for a side movement of about 2½ in., whilst the Bissel trailing axle had about 4 in. side play. It was, he said, a peculiar arrangement, but it had to be adopted because it was not possible to fit in a bogie. With regard to the question as to whether the engine was a 4-6-4 or a 4-6-2-2, he would certainly put it down as a 4-6-4.—Ed. *R.G.*]

A Plea for A.T.C.

7, Clarence Terrace, Regent's Park, N.W.1
December 1

To the Editor of The Railway Gazette

Sir,—As one who travels about the country a great deal, I find that the railway service, upon which so much depends in regard to the transport of both passengers and merchandise, is one which is receiving more and more comment and criticism.

During the past few years, a regular traveller will have noticed the once familiar semaphore signal which pointed downwards to "all clear" give place to a similar signal, but which pointed upwards to denote "all clear." In turn these are giving place to the coloured light signals no doubt with the view of greater efficiency and economy. These signals, I am told, are in many cases worked through the action of the train itself as it proceeds on its journey.

In spite of all these improvements, it only requires one of our fairly frequent fogs to dislocate all the timetables and in consequence to upset everybody's arrangements. In addition to the question of fog, I was travelling on a train after some heavy rains during the summer and it had to make frequent stops as all the lights were showing red, the rains having caused some technical hitch in the electrical arrangement. There appeared to be a telephone near to each signal and this was used to allow us to get on. It seems that such hold-ups are expected, and that the signals are reliable in fair weather only.

The one bright exception to the above is in the case of the Great Western Railway and most travellers can testify to its marked contrast with the other three big lines. The system employed there of train control which has on many occasions been the subject of great admiration in the national press both by high experts and locomotive men, seems the one way in which safety and good timekeeping can be guaranteed during rain, fog, and all other bad weather.

It has been used for so long now and with such outstanding success, that one cannot help wondering when the other lines will rise to the occasion and provide as reliable service to those travelling north, east, and south as they enjoy at present when travelling west.

The railways of Great Britain are all designed on the same gauge track and it is quite common to see a goods train composed of wagons belonging to all four of them. In some cases, too, one sees the locomotives of one company travelling over the lines of another so that one cannot believe that there is any technical difficulty in providing the Great Western all-weather system throughout all our railways. The need for this was stressed in the newspapers after a serious train disaster, and although it might cost a large sum of money, surely the avoidance of further accidents and the great advantages to the travelling public would amply compensate for the outlay.

The best we are told is that one of the other railways is experimenting with something similar on one of its branch lines to the seaside, but one cannot imagine anything more strange as the experimental stage must have been passed years ago, the system having been in use on the Great Western for many years.

Yours faithfully,
WM. PRESCOTT

Free Wheels for Rail Vehicles?

"Ruara," 72, Ascog Terrace,
Toowong, Brisbane
October 19

To the Editor of The Railway Gazette

Sir,—During a discussion some years ago upon curve resistance to railway vehicles, one speaker remarked that if the axles were fixed and the wheels free one important element of resistance would be removed. On inquiring from mechanical men I was informed that it was largely a question of difficulty of lubrication of the free wheel.

Now that roller bearings are coming into use this objection disappears; and when one realises that axle dimensions are made large because of continual reversal of stress it certainly appears that a case could be made out for a radical change in the axle and wheel design of coaches and wagons. If the wheels of road vehicles can be free why not railway wheels?

Designers of springing of vehicles would at once appreciate the beneficial effect of reducing unsprung weight, and the civil engineers would welcome a change reducing the hammering effect of wheels on rails. Possibly this idea has been thrashed out before and good reasons found for the continuance of the universal practice of fixing wheels to axles.

Yours faithfully,
W. J. DOAK
Engineer for Bridges, Queensland Railways

PUBLICATIONS RECEIVED

By Road, Rail, Sea, and Air. With Illustrations by Barnard Way. London: Raphael Tuck & Sons Limited, Raphael House, Moorfields, E.C.2. 10½ in. × 8in. 47 pp. Stiff covers. Price 1s. 6d. net.—Most of us can think of at least one son or nephew under twelve, and in his connection this book should go a long way towards solving one of the annual Christmas problems. Barnard Way's drawings are delightful, and as far as we can see of unchallengeable accuracy, which is by no means always the case in juvenile books. The text is in narrative form. Thus there is a light aeroplane called *Midge* who has conversations with air-liners and an airship; a small tank engine named *Tom* who extracts useful information from an old locomotive, an affable signal and other acquaintances; the tug *Trusty*, whose informative friends include a liner, a floating whale-oil factory, and a retired clipper ship; and *Bobbin*, the baby car, who learns about other aspects of road transport from a bus and a coach. These little stories are well written and brightly told. Our only criticism is that they are not quite up to date, as the Flying Scotsman and the Royal Scot are still allowed to rule the roost, and among other "characters" are the late lamented Atlantic liner *Olympic*, and the *Graf Zeppelin*, which has probably finished her active life. Otherwise this is an excellent piece of work and a very remarkable eighteen-pennyworth.

Ajanta and Ellora Caves.—An interesting illustrated brochure has reached us from the London office (274, Gresham House, Old Broad Street, E.C.2) of H.E.H. The Nizam's State Railway, dealing with the Ajanta and Ellora caves, a convenient centre for visiting which is the railway-owned hotel at Aurangabad in the Hyderabad State, Deccan. This booklet does not waft one about on a sea of superlatives, but begins in a common-sense manner by giving the railway fares from Bombay to Hyderabad and from Hyderabad to Aurangabad, together with the most convenient rail services. Once safely ensconced in the hotel, an attractive two-day itinerary is set out for visiting, on the first day the Bibi-Ka-Muqbara, a great mausoleum modelled after the Taj Mahal of Agra; the Panchakki, or water mill, which contains the shrine of Sha Musafir, a Mahommedan Saint; Raoza, where may be found the sepulchre of the great Moghul Emperor Aurangzeb; and the Ellora Caves, a celebrated group of rock temples, "colossal in size, intricate in plan, extravagant in decoration, with roofs, pillars, figures, bas reliefs, all hewn vertically out of solid rock." The first day is completed with a visit to Daulatabad Fort, the history of which goes back a thousand years. The second day is devoted to the Ajanta caves, not famed for sheer size, but pre-eminent among the ancient remains of India for an admirable combination of architecture, sculpture, and painting. The walls, ceilings, and pillars of nearly all of the 29 caves were at one time adorned with paintings; remains are still to be found in 13 of them. These paintings, a great and beautiful work, represented scenes from the Jatakas, the stories of Buddha's previous births in various forms—human and other—as a bird, an animal, and a reptile.

Storstrøms Broen: (The Storstrøm Bridge). Issued by the Danish State Railways to commemorate the opening of the bridge on September 26, 1937. 91 pages, 11¾ × 8¼, 1 coloured map, 67 half-tone and 30 other illustrations. — This handsomely produced volume begins with an account of the numerous proposals, dating from 50 years ago, for making a railway bridge over the Storstrøm, the stretch of water separating the islands of Zealand—on which Copenhagen stands—and Falster, on the direct main north-south traffic route from the Danish capital to northern Germany and Berlin, via Gedser and Warnemünde. Between these ports and across the Storstrøm itself there have for some years been train ferry services, but the new bridge, described and illustrated in our issue of October 22, replaces the last-mentioned ferry, enabling journey times to be much shortened. After the opening of the Gedser ferry in 1903 the question assumed greater importance than before. Traffic increased, and it was desired to compete more effectually with the Sassnitz-Trälleborg route between Germany and Sweden. Proposals for a tunnel as well as for a bridge were made. Nothing came of the discussions for a long time, but eventually the growth of motor traffic made the desirability of facilitating the passage of road vehicles as well as trains evident; finally, serious investigations were begun in 1931, involving borings and soundings, the study of land and water traffic movements and local weather difficulties, especially those due to ice; and contracts were placed in 1933 for the present structure.

Every stage of construction is illustrated by well selected photographs, including some aerial views, while the text is very clearly written and—at least as regards the simpler statements, figure titles, etc.—should present little difficulty to any reader used to reading German. Full particulars are given of all details, covering dimensions of parts, nature and quality of materials and methods of handling them. The connecting Masnedsund bridge is, of course, also described, as well as the deviation made in the approach railway lines, which no longer require to go to the ferry stations at Orehoved and Masnedo; there are pictures of railway bridges, the new Vordingborg station, and a plan of the new Orehoved station buildings. Details are also given of the new roads leading to the bridge. There is a table of interesting data showing the magnitude of the work done, and a 4-page supplement in French summarising the leading points in the volume. The whole forms a complete record of one of the most important civil engineering achievements of recent years and one meeting a long-felt want in Danish transport facilities.

Daily Mail Year Book, 1938. Thirty-eighth year of issue. Edited by David Williamson. London: Associated Newspapers Limited, Northcliffe House, E.C.4. 7¼ in. by 4¾ in. 296 pp. Illustrated. Paper covers. Price 1s. 0d. net.—Nineteen thirty-seven is now, if we may use a seasonable cliché, "drawing to its close"—we have received an early reminder of this in the form of the "Daily Mail Year Book." This annual review of current events contains in its 300 pages of close type almost sufficient information to relegate it to an encyclopædic status. Entries range from Abyssinia to Armorial Bearings, from the Fabian Society to Forestry, and from Beer Consumed to British Railways. On the last-named subject, Mr. H. G. Archer has given an impression of the year's railway events in one and a half pages. Hampered, apparently, by the pressing claims of the next entry "Squash Rackets in 1936-37," mention has had to be confined to the Railway Staff National Tribunal decisions on rates of pay and conditions of employment; notable accelerations and new trains; electrification; and long rail welding.

Tremain's Token Exchanger. Bulletin No. 18 of the Siemens & General Electric Railway Signal Co. Ltd., East Lane, Wembley.—This pamphlet describes with well-selected illustrations a new type of automatic exchange apparatus for single-line token working, due to Mr. W. E. Tremain of the Buenos Ayres & Pacific Railway, and which is, we are informed, being marketed by the S.G.E. Company in conjunction with the Railway Signal Co. Ltd. of London and Liverpool, the well-known manufacturer of several types of electric token instruments. The apparatus as illustrated is designed for electric staff exchange, and is distinguished by the method of receiving and delivering the staffs and its action in removing the mechanism clear of the gauge when exchange has been effected. No hoops are used, the staffs being placed in cigar-shaped leather pouches which are caught in funnel-shaped receivers. There are no gears or wheels in the exchanging mechanism and only one spring, and it can be readily adapted to different passing loop layouts, of which diagrams are provided. The apparatus is claimed to work with much less shock and hence less wear and tear than previous devices of this character.

Welding Electrodes.—By a typographical error the new Murex electrodes described under this heading last week were referred to as "Gronex" instead of "Ironex."

THE SCRAP HEAP

Mrs. Annabelle Cooper began working in the locomotive shops in Battle Creek, Michigan, in 1918, because she needed money to support her daughter, and male labour was scarce on account of the war. She has been on the job ever since and claims to be the only woman in the United States who operates an overhead railway crane.

* * *

The Grand Trunk Railway Company has decided to test the new system of heating the cars direct from the locomotive, abolishing the stoves which have been so disastrous to wrecked trains.—*From the "Canadian Gazette" of November* 24, 1887.

* * *

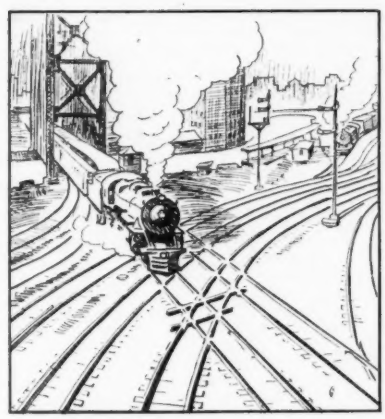
In view of recent paragraphs which have appeared in these columns regarding archæological finds during the construction of new railway works, it is interesting to notice that similar incidents were being recorded in the press of a hundred years ago. In 1837, for example, the *Mining Journal* stated that "the remains of mammalia have been found on the plains of Cheshire. In the progress of cutting for the Grand Junction Railway, two grinders of the elephant were discovered in a bed of gravel replete with marine shells." In the same year the *Journal des Debats* quoted a letter from Rouen mentioning that, on digging in the Basin de St. Valero for the foundation of a drawbridge, a kind of buried forest had been discovered, about 100 feet below the level of the soil. Vines were likewise found, and the bones of wild oxen, together with the horns of stags. Such was the state of preservation in which these subterranean trees were found, that in many instances the nuts were still hanging to the bushes. Our predecessor, *The Railway Magazine*, in referring to this, added "Query, were the boys found picking and eating them too?"

* * *

The latest practical demonstration of the Soviet Government aim to establish the equality of women with men in all walks of life, public, economic, and cultural, is recorded in the Madrid newspaper, *El Sol*, of November 20. It takes the form of the conferment of the Order of Lenin upon Zinaida Troilskaia for her work as a locomotive driver, and the paper also publishes a reproduction of a photograph of the lady in question on her engine.

* * *

A good story is told of the late Sir Eric Geddes when he was Director of Transport during the war. One day, pacing up and down in front of his headquarters in France, and thinking out a certain problem of transport, he was annoyed with a sentry who kept presenting arms every time he passed. To a corporal, who came to deliver a letter to him, Sir Eric remarked that the sentry kept on lifting his rifle every time he passed, and that it must be a nuisance. The tactful reply of the corporal was that the annoyance would be stopped if Sir Eric acknowledged the salute! When the story was told in one mess it delighted everyone except one peppery old regular major, who struck the table and said, "And that's what comes of making a damned railway porter an officer."



Remains of a long disused crossing in Chicago left to preserve the rights of the Alton RR. A Pennsylvania RR. main line train is seen crossing the Chicago & Western Indiana RR.

One Hundred Years Ago

Extracts from the December, 1837, issue of "The Railway Magazine" (afterwards "Herapath's Railway Journal") and the oldest constituent of THE RAILWAY GAZETTE

Great Western Railway.—We hear that the line is completely formed from Paddington to Maidenhead, with the exception of about six miles, which has the ballast on the spot ready for being put on.

Greenwich Railway.—It is a remarkable fact, that not one serious accident has occurred to any of the passengers during the whole time, now upwards of a year and three-quarters (the carriages first ran for hire on February 8, 1836), that the railway has been open to the public, and during which time but two lives have been lost by accident. Can as much be said of coach travelling?

Stupendous Locomotive Engine.—On Thursday last, at the celebrated works of Messrs. Robert Stephenson and Co., of this town, the trial of a splendid and powerful locomotive engine, constructed for the Great Western Railway Company, took place. This machine is called the *North Star*, and is destined for the Great Western Railway, and calculated to run at the rate of fifty miles an hour with fifty tons burthen attached, and with the tender only, at the immense speed of eighty. Several eminent engineers were present on the occasion, who expressed themselves highly satisfied with it.—*Tyne Mercury.*

Standing Orders.—We are happy to see that an Honourable Member, Mr. Guest, has given notice of his intention to call the attention of the House to the Standing Orders relative to railways. We have not the pleasure of knowing the Honourable Member personally, nor the view that he takes of the Standing Orders; but we do think they cannot be made worse for public improvement, unless they be altered to prevent the introduction of any Bill whatever for railways.

Belgian Railroad.—Brussels, November 18.—We are assured that the subscriptions opened yesterday at the Bank of Belgium for thousand shares of the Rhenish Company of the iron rail-road from Cologne to the Belgian frontier, amounts to the immense sum of 629,000 francs. The result of this subscription gives one certificate for 30,000 francs, and one for a sum below that amount. For every demand exceeding a million 34 certificates will be given for the first million, and one for every additional 300,000.—*Sun.*

Naples, October 29.—The railroad from this city to Castellamare, will be commenced in the month of November. M. Bayard, of Paris, the contractor, arrived here several weeks ago. —*Morning Chronicle.*

Dublin and Kingstown Railway.—The returns on this railway are steady and productive. Every half year a portion of the Government debt is paid off. The extension to the packet wharf at Kingstown has been productive of the very greatest accommodation to the public, and convenience to the Post-office.

Foreign Railroads.—The railroad system appears to have gained more favour in Austria than in some of the minor states of Germany. While the King of Bavaria declares in an official ordinance that he will make no concession to the proposed railroad between Manheim and Darmstadt, a letter from Vienna, dated the 30th ult., states that the Emperor would in person lay the first stone of the Great Northern Railway, and would, with the Empress and the whole *corps diplomatique*, make the journey from Wigram.—*Times.*

OVERSEAS RAILWAY AFFAIRS

(*From our special correspondents*)

INDIA

The First Air-Conditioned Train

With the completion and preliminary trials of the five air-conditioned coaches constructed at the G.I.P.R. workshops at Matunga,* the Chief Commissioner of Railways and the members of the Railway Board invited a party of officials and journalists from various parts of the country to be present during a trial run from Delhi to Agra in the first air-conditioned train in India, on October 31.

As the train, consisting of four air-conditioned first class coaches and two dining cars, steamed out of Delhi, the difference between the old and the new types of coach was soon appreciated by the guests, particularly by those who had come from Calcutta, Bombay, and Karachi after travelling 23 hr. or more in carriages without the air-conditioning equipment. Their experience of the heat, dust and noise in the old stock was in striking contrast with the cool and homely feeling that obtained throughout the new train. The exclusion of outside air and heat necessitated the construction of fixed windows and the equipment of special insulating devices, which also had the welcome effect of completely eliminating dust and smoke from the carriages. In addition, sound insulation was so successful that the noise of the train was subdued to a mere purr which did not prevent conversation in normal tones. In fact, but for this hum and the gentle, throbbing pulsation of the air-conditioning plant, the traveller might have been in a private library or drawing-room.

Uniform Temperature and Humidity

Throughout the trip, a uniform temperature of 72° was maintained inside the coaches, while the outside temperature was 84° and that in the dining car 90°. The humidity inside the coaches was kept at 55 per cent. The conditioned air circulating within the coaches was changed every four minutes without draughts. It was ascertained the next day that none of the forty passengers was any the worse for emerging from the cooled carriages into the higher temperature outside.

Illustrated literature giving details of the air-conditioned coaches was distributed to the guests, together with reprints from THE RAILWAY GAZETTE of November 20, 1936, of an illustrated article on the new air-conditioned coaches in Malaya. Each of the new coaches cost about Rs. 95,000 (£7,125), representing an increase of about Rs. 40,000 (£3,000) over the cost of ordinary first class coaches. Each coach accommodates 14 passengers in five two-berth compartments and one four-berth compartment. Accommodation is also provided for luggage, and an attendant whose services are available to convert the adjustable seats in the passengers' compartments into beds at night. These coaches will be attached to the mail trains operating between Howrah and Bombay over the E.I.-G.I.P. route in addition to ordinary first class coaches. The railway will provide bedding in these coaches. A supplementary charge at the rate of one rupee per 50 miles or part thereof will be levied for this service over and above the usual first class fares.

* Described in our Special Overseas Number of November 24.—ED. *R.G.*

ARGENTINA

Entre Rios and Argentine N.E. Railways Strike Settled

The strike on the above railways [which was reported in our news columns of November 19 as having been settled, and was again referred to in the Overseas columns of our issue of November 26.—ED. *R.G.*] terminated on November 17, following an ultimatum issued by the Government to the men to return to duty under the conditions stated below. The stoppage, which like the one it closely followed on the Cordoba Central Railway, was at first fixed at 2 hr. a day, this period being gradually extended to 4 hr. a day, resulting in serious disorganisation of the services throughout the entire zone served by both companies.

Several conferences were held between the representatives of the railways and the unions, at which the Minister of Public Works, Dr. Manuel R. Alvarado, was present. Although the nature of the negotiations was not divulged, it was reported that the discussions were based on the feasibility of meeting the men's demands by restoring part of the wage cuts imposed in 1931, with the possibility of still further reducing these, should the financial position improve sufficiently to justify this measure. Finally, on November 15, the Government determined to bring the dispute to an end by issuing a Decree ordering the men to return to work within 48 hr., otherwise legal action would be taken against them.

Repudiation of Agreement by Men

The Decree pointed out that the wage deductions and "short time" arrangement had been mutually agreed upon, after discussion, between the companies and the men, with the approval of the Government, and had been ratified by the Presidential Award of October, 1934, which both the companies and the men had accepted, but which the latter now wanted to repudiate; an action which, in the opinion of the State law officers, neither of the parties to the agreement was entitled to take. The Decree considered that it was the duty of the railway unions to see that the terms of the Award were faithfully observed by their members, and stated that they would be held responsible for any illegal action on the part of any of the sections of the men that had declared the strike.

In regard to the financial position of the companies, the Decree declared that this was even worse than when the agreements were signed in 1931. The net receipts did not suffice to cover the interest on debentures, the arrears on which, in the case of the Entre Rios Railways, amounted to £912,000 sterling, and in that of the Argentine N.E. Railway to £380,000. Nevertheless, in order to meet the men half way, the companies had agreed to cancel the wage cuts for the months of July and August last altogether, and reduce them to 6 per cent. during the remainder of the current financial year.

The men were therefore ordered to resume duty forthwith. The Decree added that their request for payment for the hours during which the daily stoppage was in force could not be granted, as there was no justification for the strike.

SWITZERLAND

Summer Traffic in 1937

Following a long period of depression, both the Federal and the private lines have this year enjoyed a remarkable return to something like pre-war traffic, as has been recorded from time to time in these pages. After a very successful winter sports season, which for some resorts and railways produced record figures, the flow of summer tourist traffic began as early as the middle of May, when the first "Swiss Specials" arrived at Basle. These trains ran constantly until the end of September, those arriving on Sundays being the most heavily patronised and regularly run in 4, 5, or even more sections. The Boulogne trains were variously composed of Nord, Est, and Alsace-Lorraine stock, chiefly of old types, and those from Ostend of Belgian National coaches. The trains which arrived at Lucerne on the Sunday mornings were frequently used to form second and third sections of evening expresses to Basle and Zurich, in order to cope with the heavy local holiday traffic between these cities and the Lake of Lucerne district. In such cases, the second class coaches bore small notices to indicate that they were available for third class passengers. In all, 188 "Swiss Specials" arrived at Basle from May to September inclusive, conveying 63,400 tourists; a proportion of these proceeded by ordinary expresses to the Bernese Oberland, Western Switzerland and other districts, but the majority were conveyed through to Lucerne in the same trains, some of them after-

wards continuing independently by regular trains to Lugano.

Zurich, Lucerne, Berne, and numerous other important stations had an appreciable share in handling the traffic, but Basle (Swiss) station had the task of dealing with the greater part of the movements from England, France, Belgium, Holland, Germany, and Scandinavia, and it is estimated that over 300,000 foreign tourists passed through the station during the summer months. In addition, a considerable amount of holiday and ordinary traffic originates in Basle itself, which has a population of some 150,000. The highest figures were reached at the August 15-16 week-end, when 115 special trains were dealt with. Late arrival of specials from Boulogne and Ostend were a frequent source of difficulty, and it required every effort of the station staff to handle this traffic as smoothly as possible and enable passengers to proceed by later trains than had been arranged. The improvements which are now under way or scheduled for next year will assist very materially in relieving congestion; they include the provision of colour-light signalling at the western end of the station (the eastern end is already so equipped), extension of platforms and rearrangement of tracks in the Alsace-Lorraine section, and the entire separation of passenger and goods traffic between the two Basle stations and between Basle and Pratteln, the junction of the Zurich and Olten lines. On page 1032 is an illustration of Basle station during the summer season.

ITALY

State Railway Improvements

Among the works completed by the State Railways administration during the past few months may be mentioned the new station at Cuneo serving the Turin—Cuneo—Ventimille line, the new station at Brennero on the Brenner-Verona line, and the new locomotive depot at Verona Porta Nuova, the cost of which amounts to 12 million lire. New railway stations have also been opened at Albenga, Loano, Villa San Giovanni, Vercelli, Arezzo, Civitavecchia, Alcamo, &c.; and depots for diesel railcars have been erected at Cremona and Catania.

It is announced that third class cars with upholstered seats are to be placed in service shortly on the Milan—Rome—Naples, Milan—Ancona—Brindisi, Rome—Reggio—Calabria—Palermo, and on the Turin—Milan—Trieste lines. Moreover, third class sleeping cars, and buffet cars are to be tried. Ordinary dining cars are not available for third class passengers.

In connection with hand luggage accompanying passengers, the administration is considering the possibility of adopting some such measure as that in force on the Swiss railways, where the conductor is empowered to transfer it from a passenger car to a baggage car when he notices a congestion in the former. Uniforms of blue cloth for stationmasters and station staff—similar to those now in use by the Italian Air Force—are to be supplied.

The administration has ordered from Italian firms new railway rolling stock, chiefly passenger and freight vehicles, valued at 400 million lire.

JAPAN

Electric Train Mows Down Crowd

On October 27 a serious accident occurred on the electric railway which runs between Tokyo and Yokohama. A large crowd of people had assembled on the railway to see off relatives and friends who were leaving on a troop special *en route* for China. Unnoticed by the crowd and unheard above the cheering, an electric train approaching at full speed on the opposite track was unable to stop before dashing into the crowd, seriously injuring many, and killing over twenty outright. The mishap occurred between Yokohama and Kanagawa.

CHINA

North China Railways and the S.M.R.

There is now evidence that, although the South Manchuria Railway will take over all railways in North China regions occupied by the Japanese, it is still uncertain whether the activities of that administration will be confined to railway operation—as in Manchukuo under the latest scheme—or whether they will embrace extensive heavy industries as was the case in Manchukuo until a few months ago.

Meanwhile, regular train services have been resumed on the Peiping-Hankow Railway from Peiping as far southwards as the Hopeh-Honan border, a distance of nearly 300 miles.

Chengtu-Chungking Construction

As already reported in THE RAILWAY GAZETTE, work has begun upon this important new railway to link Chengtu, the Capital of Szechwan Province, with Chungking on the Yangtze River. Formation including tunnels, and bridgework in the first 70 km. from Chungking are now well in hand, the largest work in this section being the bridge over the Tu Kiang. According to the project estimates, the line will be 530 km. or about 329 miles in length, and there will be 1,166 culverts, 365 bridges of various sizes, 12 tunnels, 860,000 cu. m. of retaining walls, 17½ million cu. m. of earthwork and 11½ million cu. m. of rock cutting. One of the principal problems facing the construction engineers, in view of the fact that over 100,000 tons of construction materials will be required, is transport, as the upper Yangtze is navigable only for part of the year, and then only by small country boats.

The first 125 km. of the alignment follow the Yangtze and pass through the Mao Erh Hsia gorge, but thereafter the line will run northwestwards, westwards and northwards to reach Chengtu, after passing through very broken, rugged and in places precipitous terrain. In addition to minor alternatives, over 300 km. of alternative alignments were surveyed. In the 5 km. through the Mao Erh Hsia gorge alone five tunnels are unavoidable. The ruling gradient is to be 1 in 100, compensated for curvature, but in the last 100 km. into Chengtu the steepest grade will be 1 in 143. Some 226 km., or 43 per cent., of the line will be curved; in the Mao Erh Hsia gorge 7½-deg. (764-ft. rad.) curves have to be used, but elsewhere 6-deg. (955-ft. rad.) is the sharpest curve. All curves sharper than 3-deg. are transitioned. The Tu Kiang bridge, the largest on the line, will have seven 50-m. (164-ft.) main spans. Open caissons with provision for pneumatic equipment will be used for the foundations.

NORWAY

Sörland Line

Work is being pushed ahead on the Sörland line—the direct route from Oslo to Stavanger—and the section from Neslandsvatn to Grovane is scheduled to be opened to regular traffic in July, 1938. This will link the isolated Kristianssand - Byglandsfjord line with the main system centred on Oslo, and will be a link in the new chain of communications with Jutland *via* Kristianssand.

CZECHOSLOVAKIA

The State Railways

The improved industrial and trade conditions in Czechoslovakia this year are reflected in the traffic returns of the State Railways. In June, 22,100,000 passengers were conveyed, over 2,500,000 more than in the corresponding month of 1936. Freight totalled 5,500,000 tons, being 1,500,000 tons more than in June, 1936, an improvement of close upon 40 per cent. For the first half of the current year railway receipts totalled 1,612·5 million crowns, an increase of 293·5 millions, or over 22 per cent., on the figure for the first half of 1936.

POLAND

Two New Railways Authorised

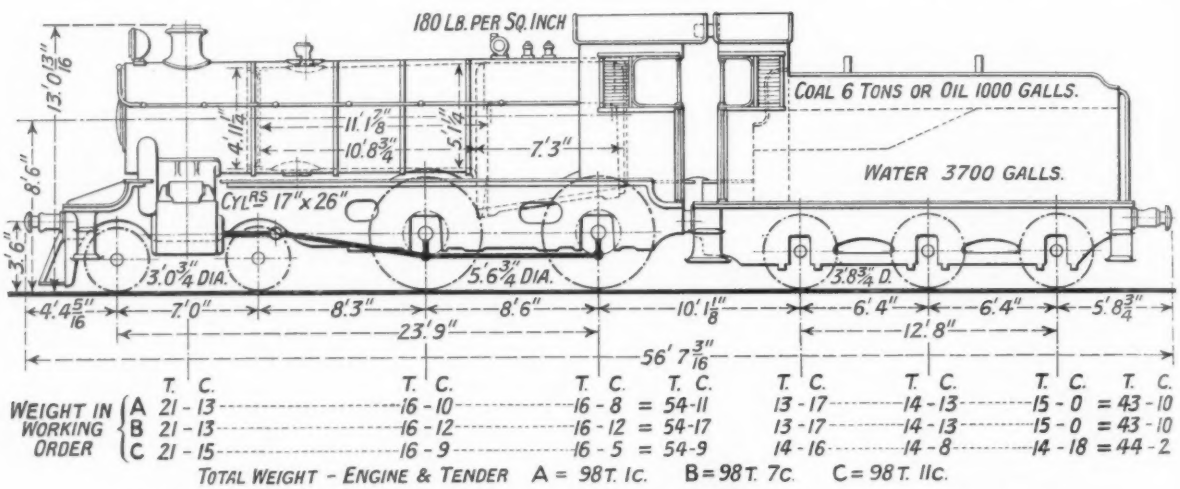
At the last session of the Cabinet, two Bills were passed authorising the construction of two new standard gauge lines of railway; (*a*) a 24-km. section in extension of the Zegreze—Tluszcz—Wyszkow line to Nasielsk, and (*b*) a 12-km. length from Szczakowa to Bukowno. Project (*a*) is estimated to cost Zl. 6,800,000 and is important in that it will open up the area on the right bank of the River Bug. Line (*b*) will be of main line standard, and be of even greater importance, in that it will link North-East Poland by a direct route with the Upper Silesian and the Krakow coal basins.

NEW 4-4-0 TYPE PASSENGER LOCOMOTIVES FOR THE EGYPTIAN STATE RAILWAYS

Twenty-six of these engines have been built by the North British Locomotive Co. Ltd., and shipped to Port Said in fully assembled condition

IN addition to an order for fifty 2-6-0 type mixed traffic locomotives placed in service in 1936, and a further recent contract for twenty locomotives of the same type, the North British Locomotive Co. Ltd. received this year an order for 26 passenger locomotives of the 4-4-0 type for the Egyptian State Railways. These we have pleasure in illustrating and describing herewith. Eighteen of the engines are arranged to burn coal, and three of these are fitted with Nicholson thermic syphons. The remaining eight engines are equipped with apparatus for burning heavy oil fuel.

The boiler barrel is made in one ring, slightly tapered, the external diameters being 4 ft. 11¼ in. at the front end, and 5 ft. 1¼ in. at the throat plate. The firebox, of steel, is stayed to the roof of the Belpaire type outer casing by direct roof stays. The water space stays are of Dunic steel, except those in the outer rows, which are copper. The large and small tubes are of steel. Steam is admitted to the main steam pipe at the highest point of the boiler, near the front end of the firebox, no dome being provided. The superheater, which has 24 elements, is of the multi-valve regulator type.



A—Coal-burning engines; **B**—Coal-burning engines, fitted with thermic syphons; **C**—Oil-burning engines

Outline diagram of one of the new Egyptian locomotives

The coal-burning engines are provided with a rocking grate having a drop plate at the front end. In the oil-burning engines, the walls of the firebox are lined with firebrick to a suitable depth, and the firepan is similarly lined on bottom, side and back plates. The oil burner, made by the North British Locomotive Co. Ltd., is situated at the front end of the firepan, which is of welded construction. A separate drawing of the oil burning apparatus is reproduced on page 1020, together with a sectional view of the firebox equipped with thermic syphon.

The burner is located at the front end of the firepan, with a small primary air door beneath it. An extension, or air-chamber, is welded to the bottom plate of the firepan, with a damper door at the front end, operated from the footplate. The main air inlet, from the air chamber to the firepan, is arranged at a suitable distance in advance of the burner, and forms also a manhole through which access to the firebox is obtained. An access door is fixed by studs to the bottom plate of the air chamber. The firedoor is of the hinged type, lined with firebrick and provided with a "peephole," through which a view of the burner and furnace can be obtained. The burner, which is rectangular in cross section, has two chambers, one above the other, the upper one for oil supply and the lower for the atomising steam jet. The burner is of gunmetal, with a lip piece fixed over the steam outlet which is 2 in. wide by about ·018 in. deep. When actual requirements have been ascertained, after tests in service, a permanent adjustment in the depth of the steam outlet is made.

The 1,000-gal. oil tank is of welded construction, with filling door and sieve. Air vents and a column for a dipping stick are fitted on top of the tank. The oil discharge cock is fitted on the front plate, and a heating coil is provided adjacent to the outlet in the tank. Steam, issuing from a small orifice in the heating coil and directed towards the oil outlet to the discharge cock, assists to liquefy the oil. In order to clear the oil outlet when necessary, a cock is fitted at the steam outlet from the heating coil, and this may be closed to provide full pressure through the orifice in the heating coil. A cock is also provided at the steam inlet to the heating coil, to prevent leakage of oil through the orifice when the tender is uncoupled. A small drain cock for condensate is fixed on the front plate of the oil tank, and a gate-valve for removal of sludge is connected to the bottom plate.

Fuel oil gravitates from the tank to a regulating cock

placed under the driver's platform. The passage in this cock is square, and arranged to provide finely graduated openings to suit operating or stand-by conditions. The openings are regulated by a handwheel, in gear with a toothed sector, with graduated markings from 0 to 90 deg. When they have been ascertained in service, the stand-by or operating positions can be distinctly marked, to facilitate the work of the engine crew and to ensure efficient operation.

The manifold is placed on the back of the firebox, on the right-hand side, the steam supply being obtained from the main supply cock on the stand for mountings. The steam cock is in communication with the lower chamber in the burner, and great care must be taken to ensure that the pressures used are no greater than necessary to obtain complete combustion in service, or to suit stand-by conditions. A gauge is provided to show the pressures used. The steam heater cock is in communication with the heating coil in the oil tank, the steam necessary to liquefy the oil being regulated at this cock, or those adjacent to the oil discharge cock on the tender. The cleaner cock is in communication with the upper (oil) chamber in the burner, and is utilised only when necessary to blow through for cleaning purposes. An auxiliary steam cock, through which steam from an outside source is obtained for starting up, is fixed on the right-hand side of the manifold. An auxiliary blower cock is also provided on the top of the manifold for starting up purposes.

The following are the main particulars:—

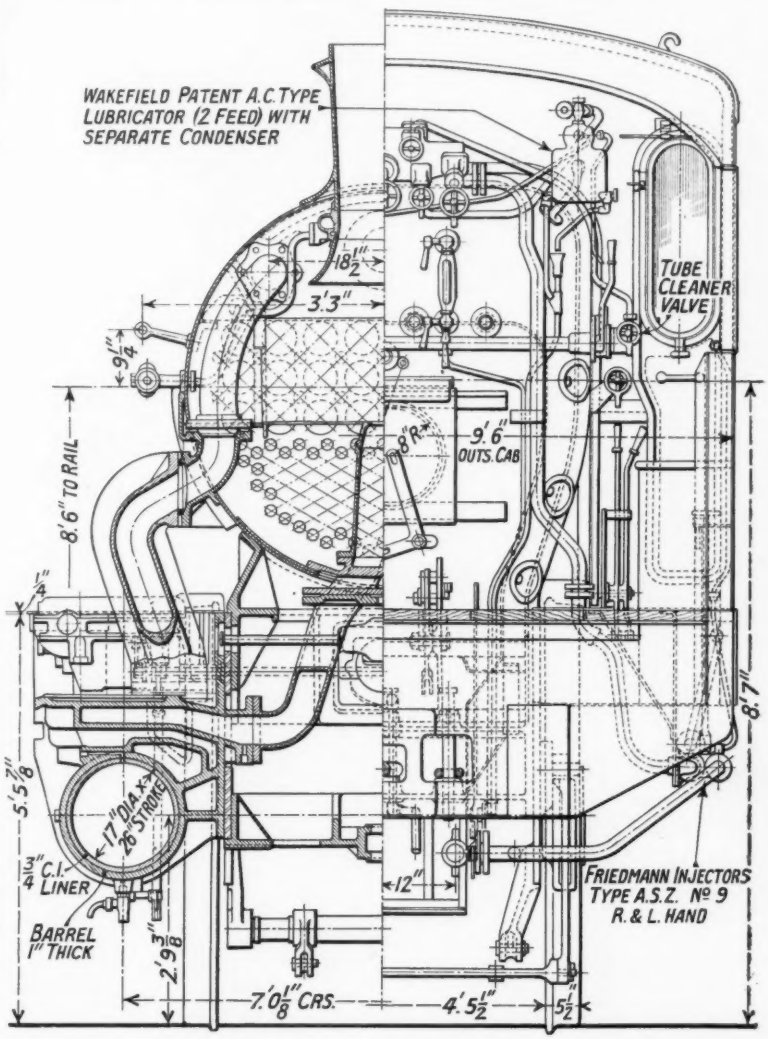
Cylinders, dia.	17 in.
Piston stroke	26 in.
Wheels, coupled, dia.	5 ft. 6¾ in.
,, bogie, dia.	3 ft. 0¾ in.
,, tender, dia.	3 ft. 8¾ in.
Wheelbase, coupled	8 ft. 6 in.
,, total, engine	23 ft. 9 in.
,, ,, engine and tender	46 ft. 6⅛ in.
Boiler, heating surfaces:—	
Large tubes	368 sq. ft.
Small tubes	704 ,,
Firebox (without syphons)	118 ,,
Total (evaporative)	1,190 sq. ft.
Superheater	290 ,,
Combined heating surfaces	1,480 sq. ft.
Grate area	21 sq. ft.
Boiler pressure	180 lb. per sq. in.
Weight in working order:—	
Engine	54·55 tons.
Tender	43·5 ,,
Engine and tender	98·05 ,,
Adhesive weight	32·9 tons.
Tractive force at 85 per cent. boiler pressure	17,220 lb.
Factor of adhesion	4·28.
Tank capacity	3,700 gal.
Fuel space (coal)	270 cu. ft. (6 tons)
,, capacity (oil-burning locomotives)	1,000 gal.

All the engines are fitted with Caprotti poppet valve gear. The connecting and coupling rods are made of Tormanc special steel, forged and heat treated at the builder's works. The frames are of steel plating, well stayed throughout by stretchers of cast steel and steel plates. Underhung bearing springs are provided for the coupled wheels, and the spring links are in tension. The bogie is provided with side bearers, and has laminated springs for control of side movement.

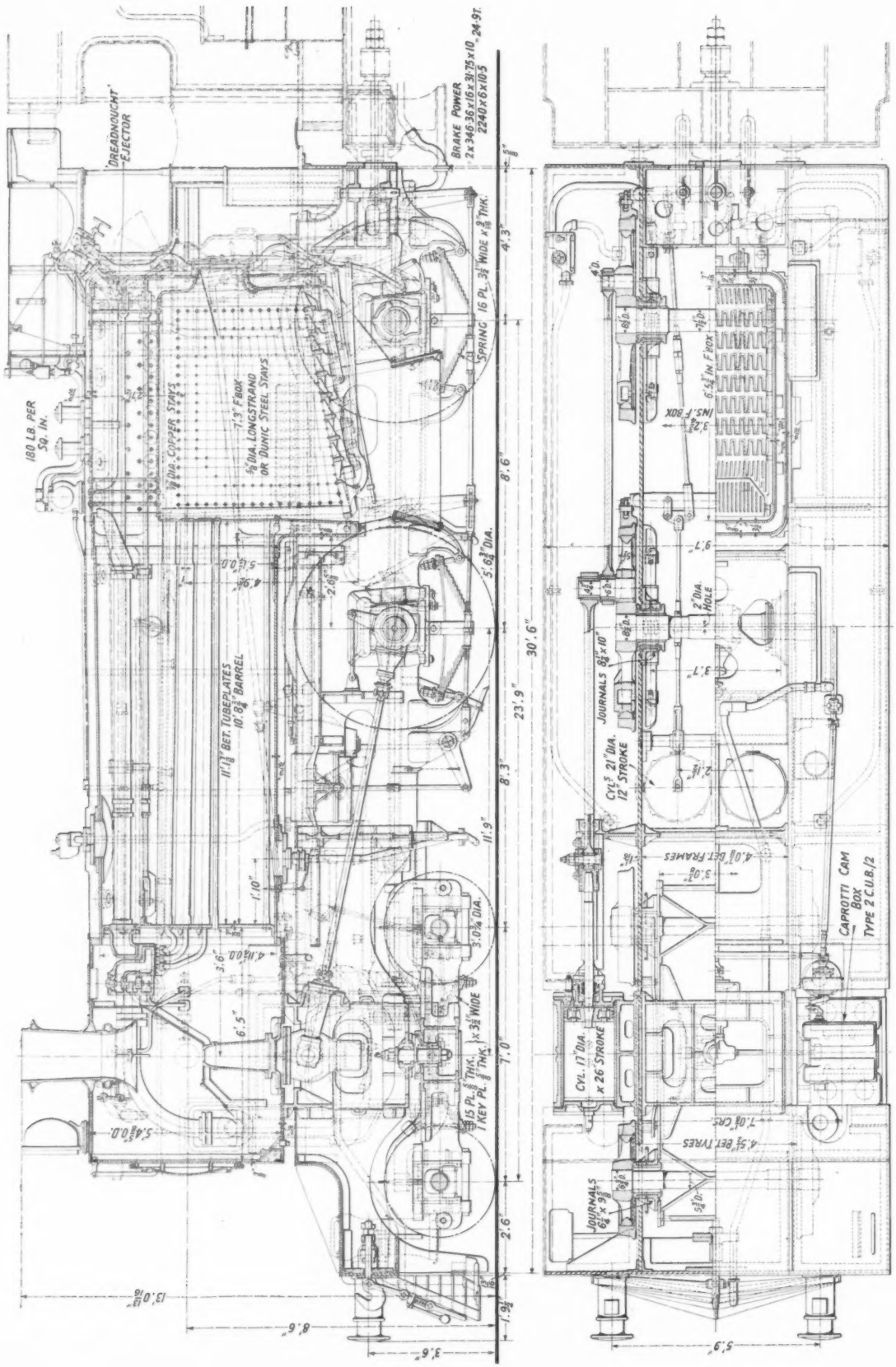
General steam fittings include Friedmann injectors, Gresham & Craven Dreadnought ejector, Ross pop safety valves, Evrit blow-off cocks, and Klinger water glass gauges. Britimp metallic packing is fitted at the piston rod glands. The buffers are of Turplat Noweld make. A two-feed hydrostatic lubricator of the Wakefield A.C. type, supplies lubricant to the cylinder barrels—lubrication to the valve stems of the Caprotti gear is not required. The boiler and cylinder clothing plates are sprayed with Limpet asbestos, covered with aluminium foil. Stone's electric lighting equipment is installed. The coupled axlebox bearings are arranged for hard grease lubrication on the Ajax system, while the connecting and coupling rods, spring and brake gear, are fitted with Ajax grease nipples. Vacuum brake apparatus is fitted on engine and tender, and, in addition, the tender is equipped with a hand brake.

The tenders for the coal-burning locomotives are similar to those supplied with the 2-6-0 type engines. Those for the oil-burning locomotives are equipped with a fuel oil tank situated above the water tank. In other respects, the tenders are identical.

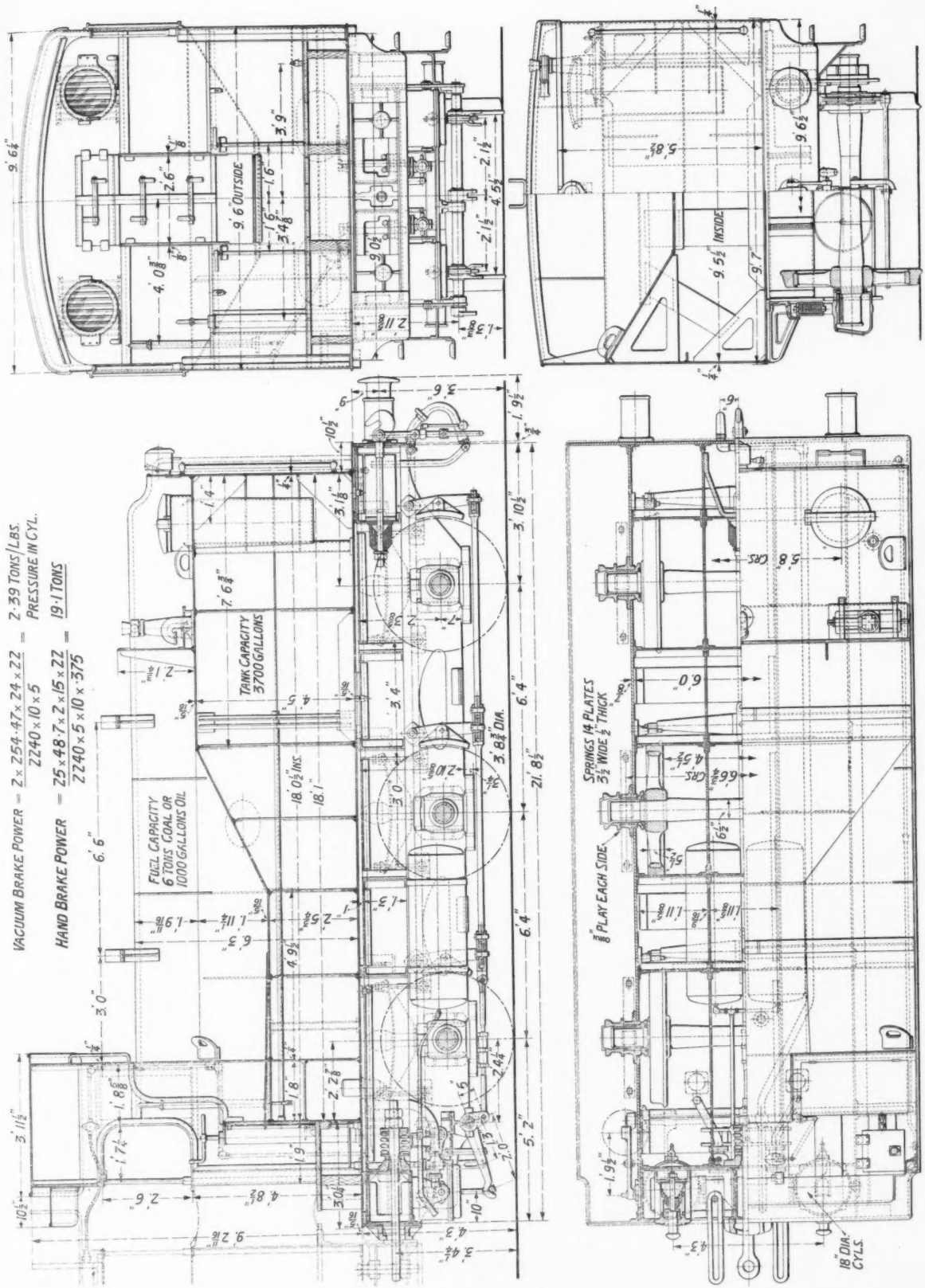
The locomotives were manufactured to the designs and requirements of the Egyptian State Railways.



Half cross sections through front end and cab of new Egyptian State Railways 4-4-0 type passenger locomotives

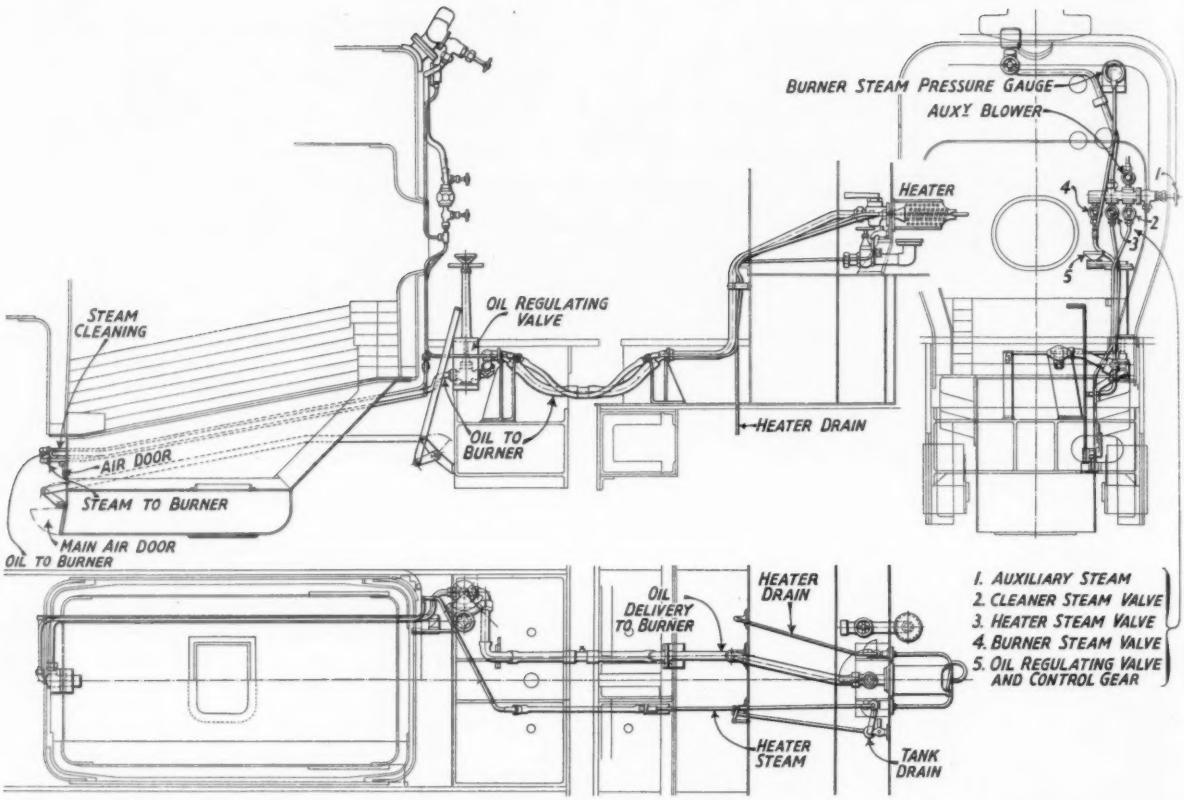


Longitudinal and horizontal sections

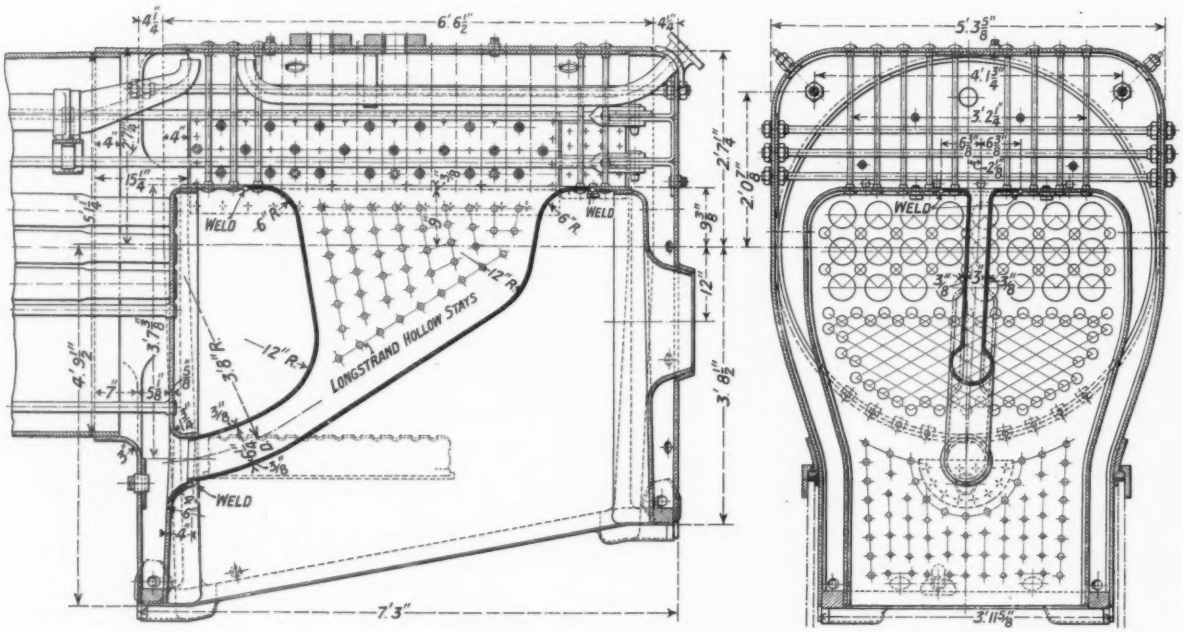

VACUUM BRAKE POWER = 2 × 25·4 · 47 × 24 × 22 / 2240 × 10 × 5 = 2·39 TONS/LBS. PRESSURE IN CYL.
HAND BRAKE POWER = 25 × 48·7 × 2 × 15 × 22 / 2240 × 5 × 10 × 375 = 19·1 TONS
TANK CAPACITY 3700 GALLONS
FUEL CAPACITY 6 TONS COAL OR 1000 GALLONS OIL
SPRINGS 14 PLATES 3½" WIDE ½" THICK
⅞" PLAY EACH SIDE
18" DIA. CYLS.
9'6" OUTSIDE
9'6" INSIDE

Details of the tender

NEW EGYPTIAN STATE RAILWAYS 4-4-0 PASSENGER LOCOMOTIVE

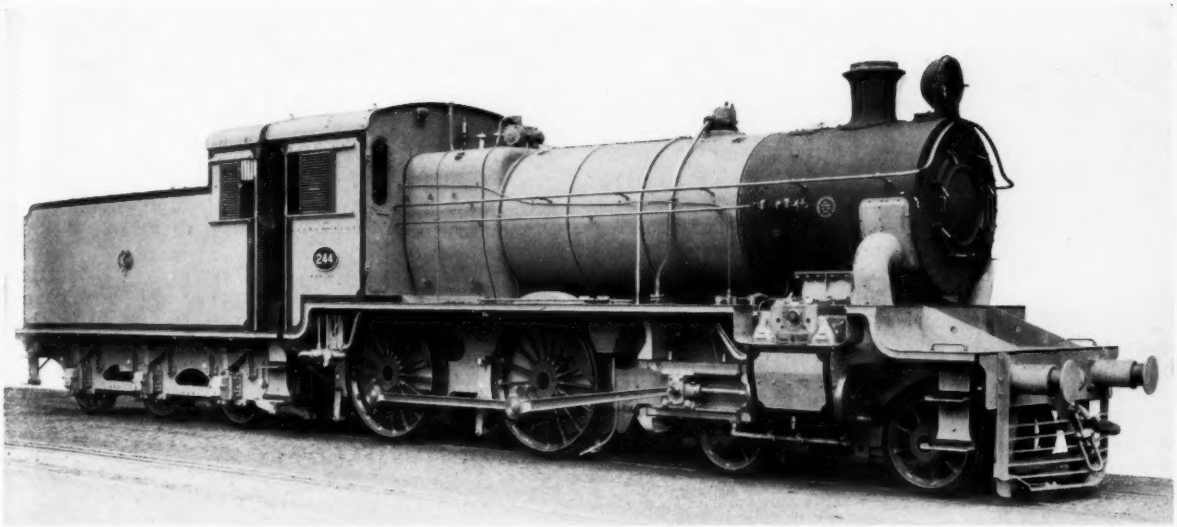


Oil firing arrangements



Details of thermic-syphon firebox

NEW 4-4-0 TYPE PASSENGER LOCOMOTIVES, EGYPTIAN STATE RAILWAYS



New 4-4-0 type passenger locomotive, Egyptian State Railways, built by the North British Locomotive Co. Ltd., Glasgow

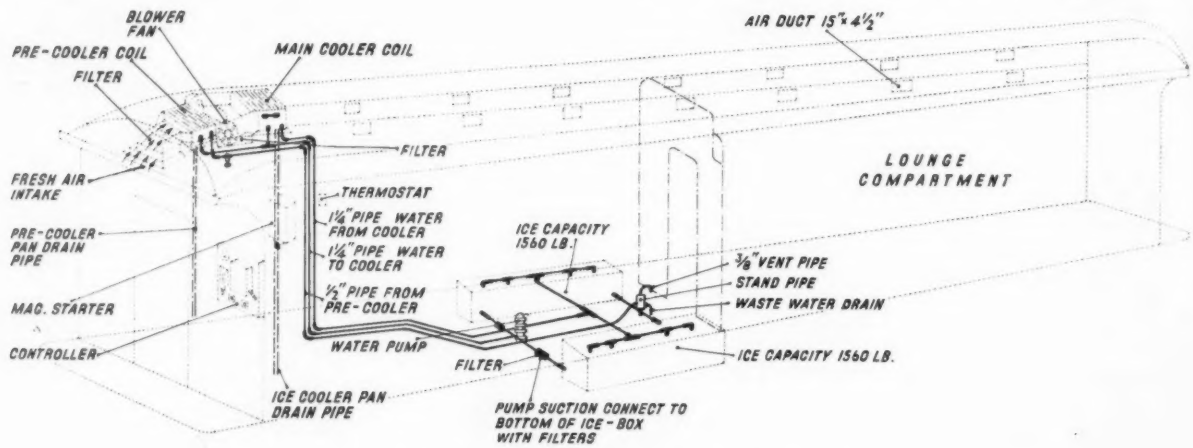
A consignment of the locomotives for shipment to Port Said

(*See article on page* 1016)

FIRST AIR-CONDITIONED COACH, KOWLOON-CANTON RAILWAY, BRITISH SECTION

A general description of this remarkable car, its air-conditioning, and an analysis of the latter

AS announced in the Overseas columns of our issue of September 24, the Kowloon-Canton Railway (British Section) placed in service, on June 14, a new air-conditioned lounge car for the Kowloon-Canton service. Named *Aurora*, this is the first air-conditioned lounge car in China; it was constructed at the Hung Hom railway workshops to the designs of Mr. James Smith, A.M.I.Mech.E., Chief Mechanical Engineer, K.-C.R., who has prepared the description of the car, sent us by Capt. R. D. Walker, Manager and Chief Engineer of the line.



Layout diagram of air-conditioning equipment

The carriage has been re-constructed from a first class wooden coach on a steel underframe supplied by The Metropolitan Carriage and Wagon Co. Ltd. in 1922. The wooden upright pillars have been reinforced with box brackets, as described by Dr. Paul Lewis Henderson, Ph.D., A.M.I.Mech.E., in his paper No. 5058, "Some Developments in Railway Carriage Construction" read before The Institution of Civil Engineers, on March 12, 1936. The lower teakwood panelling (from the underframe to the cant rail) has been replaced by steel sheet $\frac{1}{8}$ in. thick welded to give one continuous sheet from end to end of the carriage. The original 14 single windows on each side have been replaced by 7 wider ones 34 in. × 53 in., thus giving a much clearer view of the outside surroundings.

Special Insulated Construction

The floor has a layer of $\frac{1}{2}$-in. teakwood matchlined boarding, next to the underframe a layer of $1\frac{1}{2}$-in. compressed granulated cork covered by $\frac{5}{8}$-in. teakwood matchlined boarding on top of which is placed 9-in. square parquet teakwood $\frac{3}{4}$ in. thick. From the underframe to the cant rail each body side consists of one continuous steel plate $\frac{1}{8}$ in. thick, but from the cant rail to the roof there is 3 in. × $\frac{5}{8}$ in. teakwood matchlined boarding to conform with the remainder of carriage stock for through service. Between the outside and inside panelling 2 in. thick compressed granulated cork sheets have been carefully fitted leaving a 1-in. air space between the cork and interior panelling.

The roof is built in the usual way over the carlines with $\frac{3}{4}$-in. × 3-in. tongued and grooved teakwood, covered with Texaco roofing; an additional sun roof has been added, giving a 2-in. air space between. Inside the carlines, sheets of compressed granulated cork 2 in. thick have been fitted, and there is an air space of 4 in. between the cork and ceiling. The ceiling is of Joinitex hardwood wallboard.

The car has been divided into two compartments; a length of roughly two-thirds is fitted up as a lounge, with fourteen comfortable arm-chairs with wide arm rests which can serve as side tables for drinks, &c., thus obviating the necessity for occasional tables. The chairs are upholstered in blue tapestry with holland linen headrests to which are attached the K.C.R. monograms in blue. The arm-chairs are easily moved when empty on the polished floor, so that passengers may sit facing in any direction; they may also be drawn together for a bridge four.

The remainder of the coach is fitted with coupé seats with collapsible tables; one side of the compartment is fitted with double seats and the other side single, which arrangement allows the corridor to pass straight through the centre of the car. Each table is provided with a reading lamp fitted with a blue shade to match the upholstery, window curtains and carpet. The two compartments are divided by an arched mirror glass partition with adjustable blue curtains. A blue centre carpet is laid the full length of the car.

The walls are carpentered in large teakwood panels and beautifully finished in the colour of Japanese ivory. This finish is obtained by rubbing into the wood lithopone powder and finally polishing with a spirit lacquer. The ceiling is painted in flat ivory white and picked out in old silver which includes the whole of the air duct. Excellent roof lighting is obtained from 14 ornamental frosted globes with three lamps each. The whole of the exterior

of the coach is painted in aluminium with lettering in blue and gold.

The cooling medium is ice activated with an overhead unit consisting of (*a*) one main cooling coil assembly consisting of a six-row 15-in. × 36-in. water coil with drain pan; (*b*) two double-width double inlet blowers with a capacity of 1,800 cu. ft. per min. at 1,325 r.p.m. against a 1-in. static pressure; (*c*) one ½-h.p. 24-V. d.c. railroad type blower motor; (*d*) one pre-cooling coil assembly 9-in. × 15-in. two-row coil with drain pan attached; and (*e*) one water circulating pump 1½-in. suction, 1½-in. delivery, running at 1,750 r.p.m. using a ½-h.p. 24-V. d.c. motor. The controls consist of: one solenoid-operated d.c. magnetic contactor for across line starting of the ½-h.p. 24-V. motor; one ½-h.p. 24-V. d.c. speed regulator; one on-and-off manual switch, providing overload protection; one relay and temperature selector; one mercurial vapour thermostat of the thermometer type, giving three controls: 85°, 80°, and 75°. (The above equipment was supplied by the Trane Company, La Crosse, Wisconsin, U.S.A., through Reiss Bradley & Company of Hong Kong.) Also two ice bunkers each having a capacity of 1,650 lb. of ice built of ⅛-in. galvanised iron sheet with a 1½-in. layer of granulated cork between the inner and outer boxes; one hydrant for governing the water level in the ice bunkers; two filters for filtering the water before entering the pump; two viscous filters for filtering the air before entering the blowers; and two exhaust fans each exhausting 200 cu. ft. per min.

The new air-conditioned coach "Aurora"

Method of Application

The ice bunkers which are fitted below the underframe, one on each side, are coupled together by two 2-in. pipes below the water. The water circulating pump is connected to the centre of one of these pipes with a filter on each side. The hydrant is fitted in the centre of the other pipe, and is not only to control the height of water in the ice bunkers, but also to receive the outlet water from the pre-cooler coils. This enables the surplus water at 70° to go to waste when the water level is sufficiently high, instead of into the ice bunkers.

Water and Air Circulation

The water from the melting ice is pumped by the circulating pump through a 1½-in. pipe to the main cooling coils, which are situated in the roof of the carriage over the vestibule. A ¾-in. pipe from the 1½-in. pipe is by-passed to the pre-cooling coils. This ¾-in. pipe is valved so that the flow of water can be regulated through the pre-cooler. The return water from the main cooler coils is returned to the top of the ice bunkers where it is sprayed over the top of the ice by means of three sprayer nozzles on each bunker, thus keeping a sufficient water level to supply the pump. The return water pipe from the pre-cooler coils is returned to the hydrant at the water level, and so long as there is sufficient water in the bunkers, this water will run to waste through the overflow.

Interior of lounge portion of the "Aurora"

The fresh air intake, which has an area of 12 in. × 12 in., is situated under the roof over the platform of the car, and provides 22·25 per cent. of the volume of air in the car. The air is drawn through this intake and passes through a viscous oil filter and over the pre-cooler coils which dehumidify the air; it is then mixed with the recirculating air and passes through the main cooler coils where it is further dehumidified.

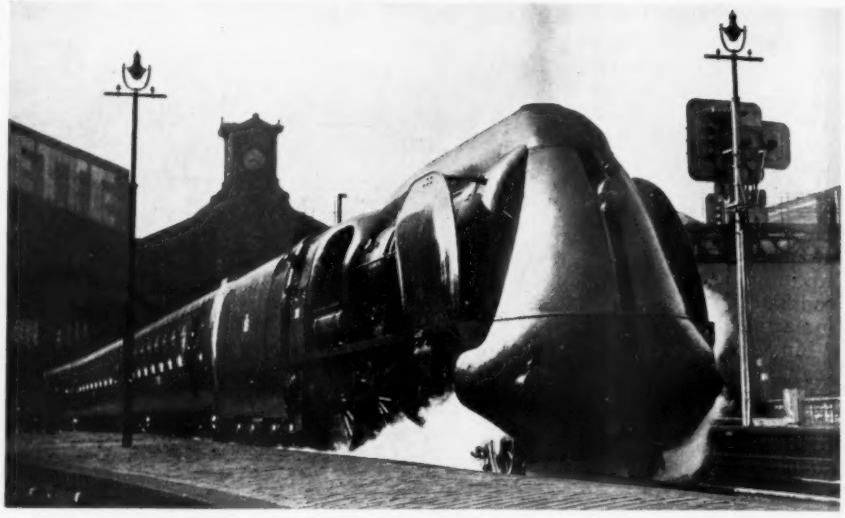
The re-circulated air, which constitutes 77·75 per cent. of the whole volume, passes through the recirculating air intake, through the viscous filter (which is situated in the roof over the vestibule of the carriage) and mixes with the fresh air before passing down the air duct to cool the carriage. The exhaust fans are situated at each end of the carriage, in the lavatories, and exhaust at the rate of 400 cu. ft. per min.

XUM

INVISIBLE STREAMLINING OF LOCOMOTIVES

Model tests of the Huet system of "fluid streamlining" lead to its application to 4-6-0 locomotives on the French State Railways

AS a result of tests* carried out on the one-tenth scale models of a French State Railways Pacific locomotive in the Lefarge wind tunnel of the Institut Aerontechnique de Saint-Cyr, a number of modified 4-6-0 locomotives for use on light fast trains have been fitted with Huet deflector plates which serve the dual purpose of smoke lifting and maintaining a sheath-like air flow along the body of the locomotive taking the place of a streamlined metal casing. The results of the tests showed a greater saving of power than can be effected by total enclosure. In addition there is a saving of weight and cost, and access to the motion plate is unobstructed. The 4-6-0 locomotives have cab and streamlined tender formed to the same section as the new light coaches described in our issue of May 21 last. In our issue of June 25 we briefly described the locomotives.

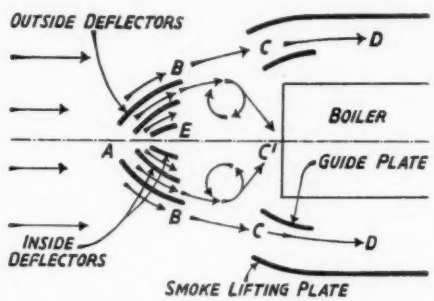


Locomotive 230.800 *of the French State Railways with Huet streamlining*

POWER ABSORBED BY AIR-RESISTANCE OF PACIFIC-TYPE LOCOMOTIVE OF THE FRENCH STATE RAILWAYS WITH AND WITHOUT STREAMLINING

	Running in still air at		Running at 120 km.p.h. (74·6 m.p.h.), in a wind of—					
			20 km.p.h. (12·4 m.p.h.)			60 km.p.h. (37·3 m.p.h.)		
	km.p.h 120 (74·6 m.p.h.)	150 km.p.h (93·2 m.p.h.)	Head	Side	Following	Head	Side	Following
(1) *Without streamlining*—								
H.p. absorbed ..	334	655	456	345	233	753	340	84
(2) *With streamlined casing*—								
H.p. absorbed ..	228	446	311	242	158	513	143	57
Saving, h.p. ..	106	209	145	103	75	240	197	27
Saving, per cent. (compared with (1)) ..	31·8	31·9	31·8	29·8	32·2	31·8	58·0	32·1
(3) *With Huet deflectors*—								
H.p. absorbed ..	197	386	262	231	136	445	418	49
Saving, h.p. ..	137	269	194	114	97	308	−78	35
Saving, per cent. (compared with (1)) ..	41·0	41·0	42·5	33·0	41·6	40·9	−23·0	41·6

As shown by the diagrammatic sectional plan, there is a set of deflector plates in front of the smokebox, mounted symmetrically about the longitudinal axis, with a vertical slot between them as shown more clearly in the photograph reproduced. These plates form nozzles or *tuyères* of such form that air entering at *A* increases in pressure as it moves towards *E*, where the pressure is sufficient to prevent air that flows along the outside of *AB* from turning into the space EC^1 and bearing on the smokebox. The air streams in question flow from *B* to *C*, where they are guided by the smoke-lifting plates and the inner guide plates, thus establishing a fluid streamlined casing inside which there is a zone of air stationary with respect to the locomotive. In other words, the locomotive is streamlined by a mass of dead air which is held to the correct aerodynamic form by the guided stream of moving air.



Diagrammatic plan showing arrangement of Huet streamlining

The accompanying table shows results of the wind tunnel tests referred to above using the same one-tenth scale model of a Pacific locomotive as was used for the study of the Pottier streamline casing (THE RAILWAY GAZETTE, January 12, 1934). The saving of power by the Huet deflectors is greater than that effected by complete casing;

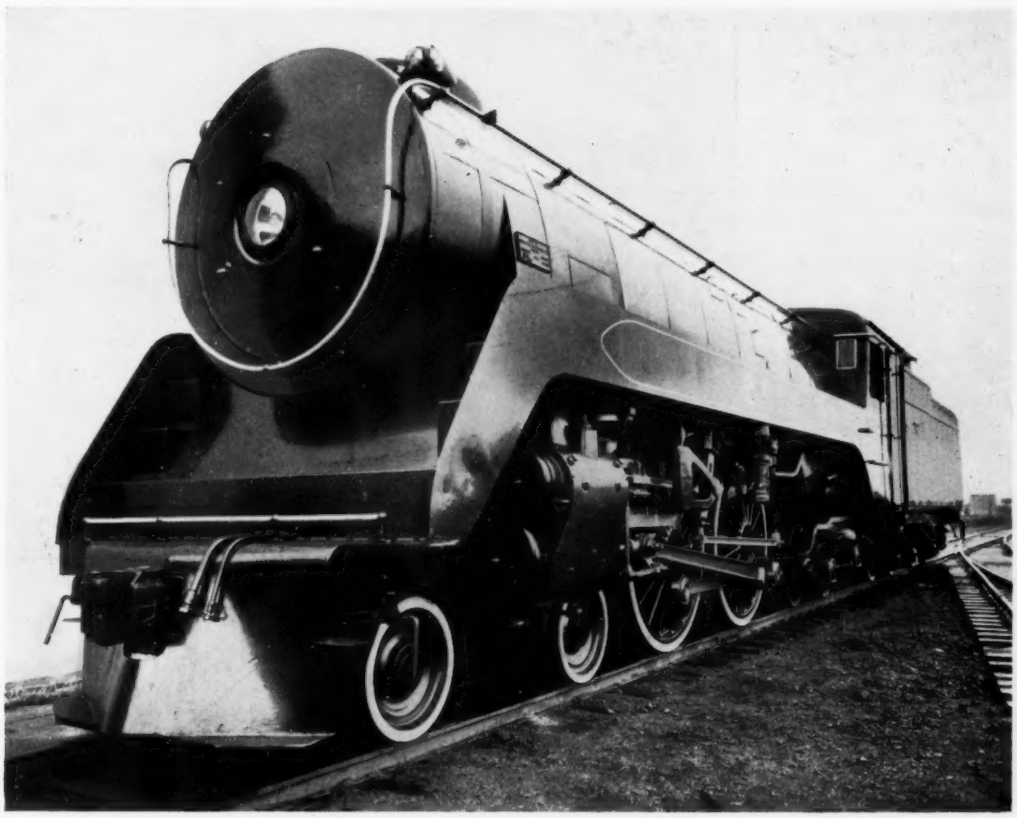
* Described in *L'Etat Notre Réseau* for October, 1937

and the smoke lifting characteristics, tested on the model by jets of magnesia powder, are satisfactory, even with side wind.

Calculations based on the results of the model tests and on official information as to actual wind conditions, show that in the case of a locomotive running 4 hours a day at 120 km.p.h. (74·6 m.p.h.), the Huet deflector system of streamlining saves about 243 *tonnes* (239 tons) of coal per annum, compared with 212 *tonnes* (208 tons) saved by total enclosure.

NEW 4-4-4 LOCOMOTIVES, CANADIAN PACIFIC RAILWAY

A modification of the "Jubilee" class, reduced in length and weight



TWENTY new semi-streamlined 4-4-4 express locomotives, embodying certain modifications of the successful "Jubilee" class engines described in our issue of August 7, 1936, are now being delivered to the Canadian Pacific Railway. The drive is on the second instead of the leading coupled axle as in the "Jubilees," and the consequent alteration of the wheelbase has allowed a reduction of about 5 ft. in the overall length of engine and tender. Boiler (pressed to 300 lb. per sq. in.), frames, and motion are of nickel steel, and an estimated reduction of a further 32,900 lb. has been achieved in the combined weight, empty, of engine and tender. The driving wheels measure 6 ft. 3 in., as against 6 ft. 8 in. in the "Jubilees," and the cylinder diameter is 16½ in., compared with 16¾ in. Equipment includes Elesco feed water heater, Walschaert valve gear giving a valve travel of 6½ in., and Type E superheater with multiple regulator. In general, the engines combine features both of the "Jubilees," and of the latest streamlined mixed traffic 4-6-4's of the "2800" class. Principal dimensions are given in the opposite column.

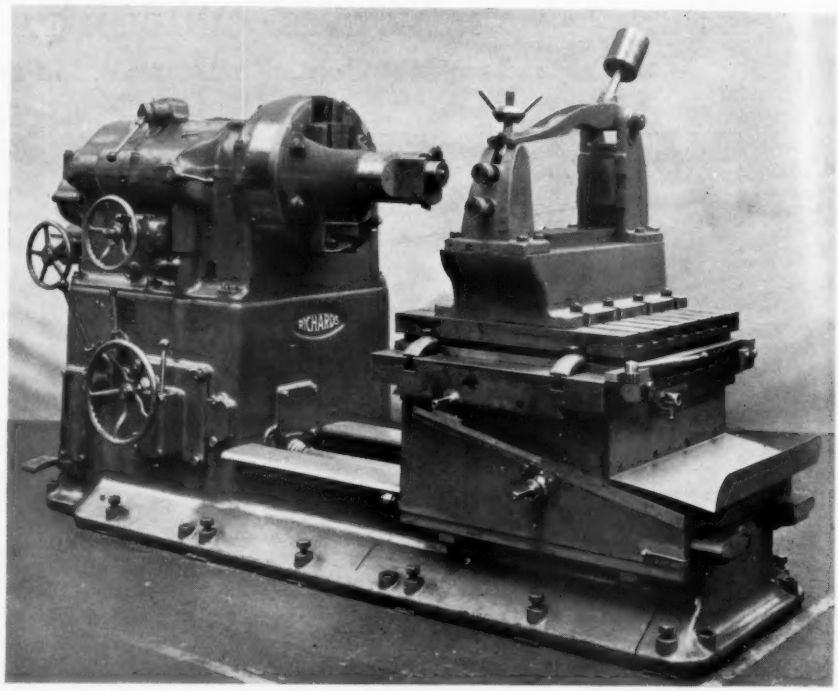
Boiler pressure	300 lb. per sq. in.
Firebox width, inside	70 3/16 in.
Firebox length, inside	93 1/16 in.
No. and dia. of tubes	48—2 in.
No. and dia. of flues	116—3½ in.
Length of tubes between tube sheets	15 ft. 10 3/16 in.
Heating surface :—	
Tubes and flues	2,091 sq. ft.
Firebox	169 sq. ft.
Arch tubes	31 sq. ft.
Total (evaporative)	2,291 sq. ft.
Superheating surface	900 sq. ft.
Combined heating surfaces	3,191 sq. ft.
Grate area	45 sq. ft.
Cylinders	16½ in. dia. × 28 in. stroke
Driving wheels, dia.	6 ft. 3 in.
Wheelbase—driving	7 ft. 2 in.
Wheelbase—engine	32 ft. 7 in.
Wheelbase—engine and tender	64 ft. 9½ in.
Estimated weights :—	
Weight on drivers	110,000 lb.
Engine (loaded) 240,000 lb. ; (light) 219,000 lb.	
Tender (loaded) 184,000 lb. ; (light) 90,000 lb.	
Water capacity	7,000 gal.
Coal capacity	12 tons
Tractive effort	26,000 lb.

XUM

THE RICHARDS PATENT AXLEBOX BORING, FACING, AND RADIUSING MACHINE

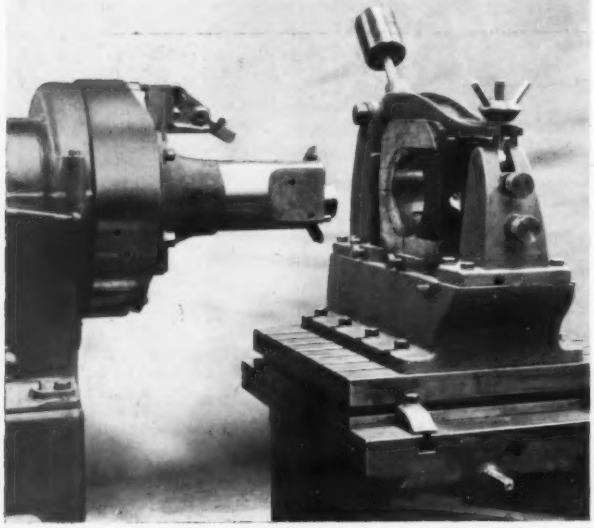
A modernised development of a machine with a reputation

THE machine tool illustrated herewith is a further development of the axlebox boring machine introduced by George Richards & Co. Ltd., Broadheath, near Manchester, some two years ago, and includes many new features tending still further to increase its usefulness. The machine has been greatly strengthened and enlarged. The increased width of the main frame and headstocks, also the wing type extension to the bed which provides ample rigidity under all conditions, are features to be noted. As in the first machine, this new model incorporates a facing head with a slide having automatic reversible feeds, the toolholder carrying the combined facing and radiusing tool being mounted on the slide. The snout bar, on which are mounted the rough and finish boring tools, and also the eccentric tool for relieving the keep, are of extremely heavy construction. An interesting feature is that the base of this snout is of bridge formation to span completely the facing slide, and is rigidly bolted to the facing head.



The new Richards axlebox machine

On the bed of the machine, which is longer than previously, is mounted an incline saddle having three rates of automatic longitudinal feed, whilst rapid power traverse is also provided in the same direction. To accommodate different sizes of axleboxes, an auxiliary incline saddle is mounted on the main saddle, with hand adjustment giving a total vertical movement of 3 in. The vertical height of the axlebox is readily set by means of a rule and vernier fitted to the incline plane. Two tables are provided; the lower or main table has cross adjustment by hand on the auxiliary saddle, fitted with a vernier scale reading to 0·001 in. On top of the main table is mounted a square revolving table provided with the Richards patent squaring device.



Axlebox in position in tool

The axlebox fixture consists of pedestal carrying two fixed jaws, one of which is provided with two adjustable locking studs. The other jaw has a slot to receive distance packing pieces to suit the size of box being dealt with. The axlebox is placed in a horizontal position with the previously machined side resting on packing on top of the pedestal, and is then clamped between the horn flanges by means of a taper wedge and adjustable locking studs. The taper wedge bears against the tapered side of the packing plate on the pedestal, and is actuated by rack and pinion from the front of the pedestal. The axlebox is finally secured by the top hinged clamp and hand-operated winged nut. The cycle of operations on an axlebox is as follows:—

1.—Rough boring at high speed with a single tool in snout bar.

2.—Finish boring at 300 r.p.m. with second tool placed in snout bar after rough boring. Adjustment is then made to the main table transversely to position the axlebox for cutting side relief and the clearance in the keep.

3.—Cutting side relief and clearance in the keep with eccen-

tric tool. The axlebox is then returned to its original centre by the transverse motion of the main table, for the facing and radiusing operations.

4.—Rough facing side of box.

5.—Finish facing side of box.

6.—Radiusing operation.

The top table is then revolved 180 deg.

7.—Radiusing operation at opposite end of box.

A superior honed finish is also given to the bore by means of a special burnishing tool. The snout bar seen in the illustration is 7 in. dia., but bars of smaller diameter can, of course, be supplied for dealing with boxes having smaller bores.

The machine will face up to 24 in. dia., and eight speeds are provided to the facing head as follow: 300, 207, 126, 86, 56, 39, 23·6, and 16·2 r.p.m. The operation of the machine is very simple, all the control levers being within easy reach of the working position. A footbrake is also available for bringing the facing head rapidly to rest after the driving clutch has been disengaged by the stop and start lever.

It will be appreciated from the foregoing description that with the adjustments provided in all directions—longitudinally, transversely, and vertically—the machine is fully capable of dealing with both new and repair boxes of various sizes in the most convenient manner; and all the movements are made with a minimum of effort. Furthermore, simply by extending the length of the bed, the machine can be used with equal success on radial axleboxes. A valuable feature of the machine, however, is that with these various adjustments and the range of speeds and feeds provided, together with the top revolving table fitted with the patent squaring device, it can be adapted for use on other work, should the whole of its time not be occupied on the production of axleboxes. It should be noted that many of the features described above are covered by patents.

Millers Dale for Buxton and Blackwell Mill

REMOTELY situated in the wild Peak District of Derbyshire, Millers Dale station, on the L.M.S.R. Midland Division main line between Derby, Matlock, and Manchester, is not ideally placed for securing passenger traffic. The disadvantages of such a position, however, are amply compensated by the grandeur of the surrounding district, and with the help of a not inconsiderable tourist traffic, Millers Dale station manages to book annually about 25,000 passengers. Nearly 10,000 parcels are forwarded and received and about 120,000 tons of merchandise are also dealt with annually. The bulk of the latter is carriage forward, but the debit of the station averages about £35,000. The tonnage varies considerably owing to the closing or re-opening of certain quarries, and as much as 300,000 tons has been handled. As Millers Dale is the junction for the Buxton branch and the Western Division, there is a large transfer traffic for passengers, mails, parcels, and vehicles. The Stationmaster is also the Postmaster for the surrounding district comprising Monsal Dale, Litton Mill, and Wormhill, which has a total population of about 3,000. Besides these duties there is also under this official's care, Blackwell Mill, in many respects unique among the railway stations in this country. This halt serves an isolated village consisting of eight cottages situated alongside the River Wye. There are no shops and no church. Blackwell Mill station, claimed to be the smallest in the country, has two platforms each 10 yd. long, with " pull up " accommodation for one coach only. There is only one train which calls during the week, the 9.11 a.m. from Millers Dale to Buxton, which on Saturdays conveys the womenfolk of the village—never more than 12—on their weekly shopping expedition to Buxton, whence after 2½ hr. of town life they return presumably laden with a week's provisions.

Blackwell Mill station on the L.M.S.R. in the Peak District showing the only train to call there during the week

No mention of Blackwell Mill is made in " Bradshaw," the " A.B.C.," or the company's timetables. As there is no permanent staff or booking office on the station, a ticket collector from Millers Dale travels on the train and issues and collects tickets *en route*.

DERBY-MANCHESTER BRIDGE STRENGTHENING, L.M.S.R.—The renewal of Bridge No. 100 on the L.M.S.R. Derby-Manchester main line, just south of Chapel-en-le-Frith station, which was to have been completed last week-end, has been delayed by severe weather. The work was duly begun on Saturday, but the delay necessitated the diversion of traffic for several days. When reconstruction is complete, any locomotive not exceeding the " Royal Scot " class in weight will be allowed over the route.

"THE RAILWAY AGE"

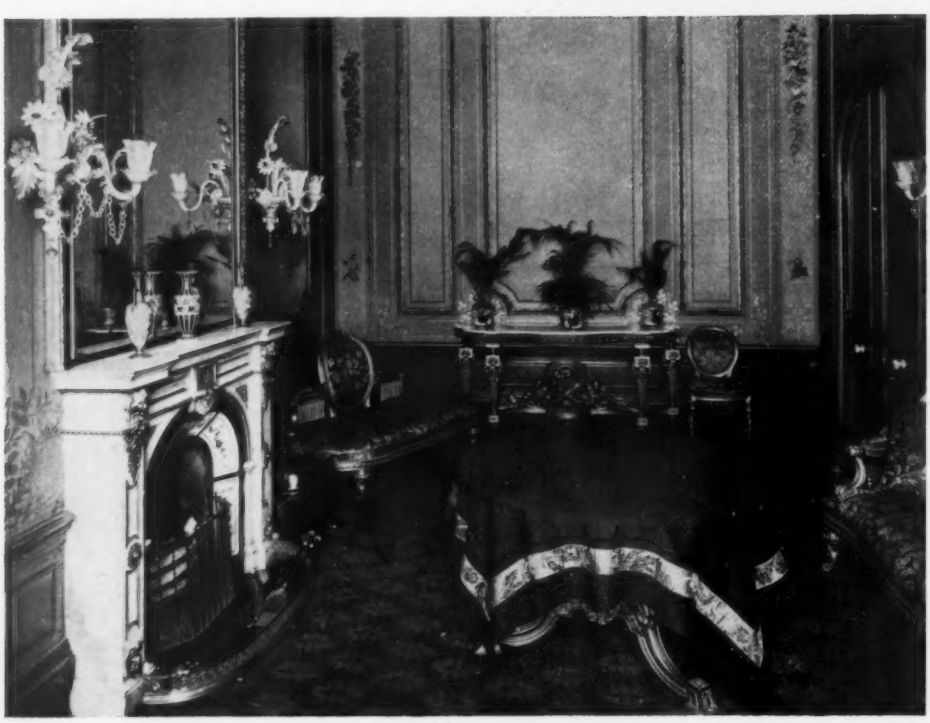
Some representative railway illustrations from the fine collection assembled in the recently-published volume of this title

IN reviewing the recently-published volume "The Railway Age," by Mr. Cyril Bruyn Andrews (see THE RAILWAY GAZETTE of October 29 last, page 719) we remarked that its illustrations constituted a finer collection than we had previously seen with in the covers of one British publication. Naturally such an assembly of early railway pictures would have been impossible without the co-operation of various private collectors, prominent among whom was Mr. John Phillimore, who contributed no fewer than 44 from his justly-famed collection. Now, through the courtesy of the publisher—Country Life Limited—and of Mr. Phillimore, we are able to reproduce on this and the facing page a few representative illustrations.

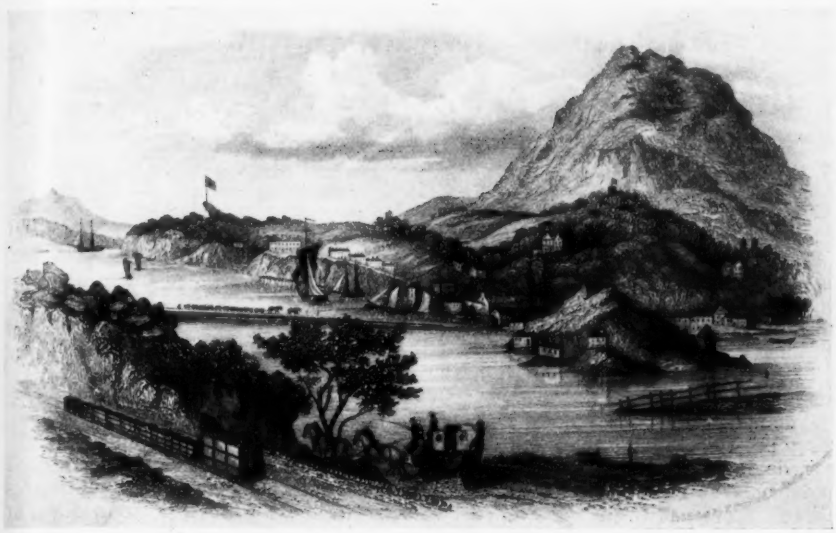
Mr. Andrews remarks that "the heavy dignity of railway decoration is at its best in the mantelpieces, panelling, and furniture of the board and committee rooms at Euston"; an example is the mantelpiece illustrated alongside. Of the old Royal waiting room at Paddington (shown below) he says "it had a typical mid-Victorian atmosphere. There was clouded glass gas brackets, chairs in the French taste, and, of course, aspidistras."

On the opposite page are three of the many scarce views relating to the early days of railway history for which "The Railway Age" is particularly notable. Regarding the bottom picture, Mr. Andrews observes that "in such prints as this the public obviously pictured the railways going along something very similar to the existing roads." This was doubtless the case in the very early days, but the necessity of segregating rail and road traffic was quickly appreciated and indeed forms a prominent feature of the proposals shown in the illustration of the London Grand Junction Railway scheme.

Above: Dove-coloured marble mantelpiece at Euston. From a photograph supplied by the L.M.S.R.

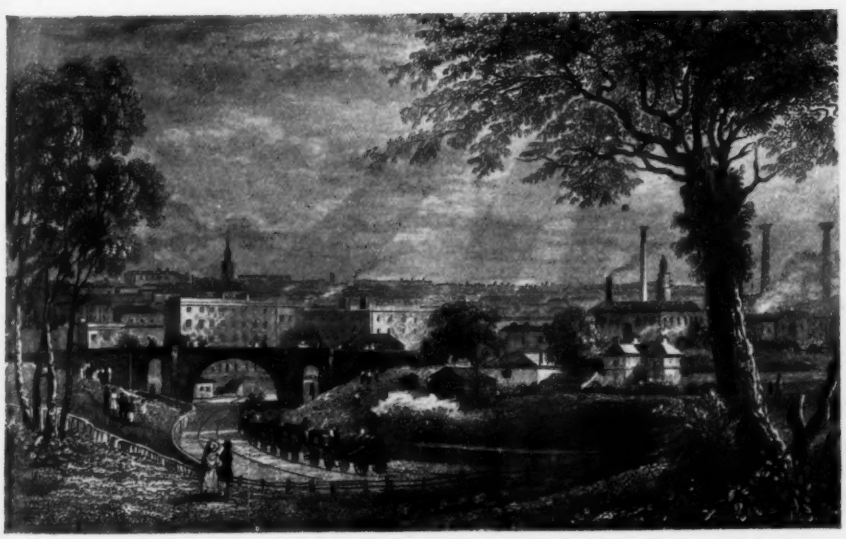


Left: The Royal waiting room at Paddington, as it existed until recently. From a photograph in the archives of the G.W.R.



Left: A view of Portmadoc, Caernarvonshire, reproduced from an engraving published by S. Pritchard. It shows two of the early trains on the famous narrow-gauge Festiniog Railway, one being hauled by two horses across the Traeth Mawr embankment, and the other travelling by gravity with the horse riding behind in a dandy cart. The original is from the collection of Mr. John Phillimore

Right: The proposed terminus at Skinner Street of the London Grand Junction Railway, as suggested in a print by Remington junior. The intended site was on the north side of Holborn (the viaduct was, of course, not built) immediately to the west of St. Sepulchre's Church, the tower of which is shown on the right of the picture. The original is reproduced by courtesy of the London County Council



Left: Reproduction of a line engraving showing the London & Birmingham Railway at Chalk Farm bridge. The twin towers of the engine house at Camden may be seen on the right. This view is complementary to the series of illustrations which we published on pages 156 and 157 of our issue of July 23 last on the occasion of the centenary of Euston station

SIGNALLING ON THE PEIPING-LIAONING RAILWAY

Modern equipment on an important Chinese line

IN the *Quarterly Review of the Chinese Railways* for July, 1937, Mr. H. C. Wang, a former Signal Engineer of the Peiping-Liaoning (Peking-Mukden) Railway, gives some interesting particulars of the modern signalling equipment in use on this line, which has a total length of 2,031 km. (1,262 miles), and forms the trunk route from Peiping, the old Chinese capital, to Mukden (Liaoning). No Signal Engineer was appointed until 1922, but certain signalling standards had already been adopted, the electric token system being in use almost throughout, with some fairly complete mechanical signalling installations at a few places. Elsewhere home and distant signals were worked from the centre of the station, detecting the hand worked points, which had facing point locks and bars. Some equipment was being made locally. The McKenzie and Holland-Sykes lock and block, as used in Ceylon, had been chosen for double line working as this was extended. Thus the first Signal Engineer found certain accepted practices to which it was necessary to adhere, at least in some measure.

Mechanical Signalling

The signals, which are of the two-position lower quadrant pattern, comprise home signals, usually about 100 m. (109 yd.) from the facing points, sometimes with an outer homes 366 m. (400 yd.) further out, and distant signals, generally 550 m. (600 yd.) from the homes (or outer homes); the distants have distinguishing fishtail lanterns, Route indicators are also used where necessary, and discs for shunting. Points and f.p. locks are rod-worked, and though all facing points have locks, bars are replaced by track circuits and electric point machines in the larger installations where the distance is too great for rod working. Lever frames at first had direct action locking, but catch handle locking was adopted in 1929, and both types are now made in the railway shops.

In recent years motor-worked semaphores, colour-light signals, and electrical route indicators have been adopted. Track circuit is generally used in station limits, mostly worked by primary battery with automatic thermal regulators. Direct-acting electric lever locks, rotary circuit controllers, and catch hand contacts are in use, and electric point detectors operating detection relays in the signal boxes. Electric control locking between cabins and route locking is fitted where necessary. Lamp repeaters are used for colour-light signals and arm and light repeaters for ordinary semaphores. At the larger stations illuminated track diagrams are installed, but bull's-eyes are used instead of lamps where economy in current consumption is essential.

The lock-and-block system is used on the double line between Tangshan and Shanhaikwan where, however, there is still about 160 km. (99 miles) of single track. Track circuit is used in the stations, and plunger and section locking for the starting or advanced starting signals, with electric treadle release. The instruments require two line wires and have a " train going " electric top indicator over the lock indicator for the section in advance, with points and plunger interlocking handle. Cancelling can be carried out only with the co-operation of the stationmaster and the signalman in the rear.

On the more important Peiping—Tangku section full signalling and interlocking is provided at all the stations, with track circuit in station limits and in some cases motor-worked signals. Miniature electric staff instruments are provided in the signal boxes interlocked with the starting signals, staff exchanging is automatic, and home and starting signals are returned to danger by the trains. The working is efficient and has saved 45 min. on the Peiping—Tientsin run. Between Petang and Hsukechuang simpler apparatus is used; hand points, with economical lock and bar are provided, with home signal detection and a distant signal, operated from the centre of the station. The staff instruments are in the stationmaster's office and staffs are exchanged by hand. The speed limit at stations is 45 km.p.h. (28 m.p.h.).

Level Crossings

Level crossings are controlled in various ways. Sometimes there is a simple gate lock, electrically controlled by adjacent signal boxes, at other places there are manually-worked barriers. Owing to a bus being run down at one busy crossing, flashing light and bell signals, track circuit controlled, have been installed. Special signal protection has been provided for the gates in the Peiping city wall, which are closed across the line at night, including a searchlight signal on each side, track circuit and route locking control on a special ground lever used to backlock the gate open for trains. If the gate is not open when a train enters the approach track circuit, which is 2,500 ft. long, a yellow indication appears in the searchlight signal and the driver must prepare to stop.

Rail and road co-ordination. The seasonal office at Braemar of W. Alexander & Sons Ltd., which issues L.N.E.R. tickets, seat and sleeper reservations, and transacts general railway business at a point about 16 miles from railhead at Ballater

RAILWAY NEWS SECTION

PERSONAL

The King of the Belgians has conferred upon Mr. Gilbert S. Szlumper, General Manager of the Southern Railway, the honour of Commander of the Order of King Leopold the Second.

Mr. D. M. Gracie, M.B.E., who, as announced in our issue last week, has been appointed District Goods Manager, Sheffield, L.N.E.R., entered Great Central Railway service in March, 1900, at

Mr. D. M. Gracie

Appointed District Goods Manager, Sheffield, L.N.E.R.

Frodingham. A year later he was transferred to the District Superintendent's Office at Doncaster, and remained there, serving in various capacities until July, 1910. Between August, 1910, and May, 1915, he carried out a special course of higher grade training in the General Manager's, Chief Goods Manager's, Superintendent's, Locomotive Running Superintendent's, Signal Superintendent's, Engineer's, Stores Superintendent's, Rolling Stock, and Portmaster's Departments. From May, 1915, until May, 1919, Mr. Gracie served in the Royal Naval Reserve as an Assistant Pay Master, and the Royal Naval Volunteer Reserve as Lieutenant. In July, 1919, he returned to railway service and was appointed Assistant District Traffic Manager (Commercial), becoming Assistant District Traffic Manager (Operative), at Manchester, in October, 1920. In 1924 Mr. Gracie was appointed District Superintendent at Leeds, from which position he now goes to Sheffield.

Mr. Yen Te-ching, Chief Technical Expert of the Chinese Ministry of Railways, has been appointed Managing Director of the Peiping-Hankow Railway, which post he will hold concurrently with his other appointments.

G.W.R. Appointments

The following appointments have been announced by the Great Western Railway:—

Mr. A. Higginson, Stationmaster and Quay Superintendent, Fowey, to be Chief Clerk, District Traffic Manager's Office, Plymouth.

Mr. W. E. Corbett, Clerk, District Traffic Manager's Office, Oswestry, to be Chief Clerk, District Traffic Manager's Office, Oswestry.

Mr. V. R. P. Woodd, Goods Agent, Shrewsbury, to be Goods Agent, Exeter.

Mr. W. M. Bryant, Chief Clerk, District Goods Manager's Office, Shrewsbury, to be Goods Agent, Shrewsbury.

Mr. A. Reidinger, A.M.I.Mech.E., M.I.Loco.E., M.I.Prod.E., having resigned from Associated Locomotive Equipment Limited, has joined the board of directors of Locomotive Valve Gears Limited, 58, Victoria Street, London, S.W.1 (telephone Victoria 7506).

Mr. H. B. Pollock has been appointed a Director of the Great Southern Railways, Ireland, in succession to the late Mr. J. X. Murphy, whose death on October 12 was recorded in our issue of October 22.

Mr. Maurice J. King, K.C., has been appointed by the Minister of Transport to be Deputy Chairman of the Appeal Tribunal constituted under Section 15 of the Road and Rail Traffic Act, 1933.

Institution of Civil Engineers

The following is among the transfers from associate member to full member, dating from November 23:—

Transferred to Full Member

Mr. Neil Brodie Henderson, 14, South Place, London, E.C.2.

From *The London Gazette* of November 30: Regular Army Reserve of Officers, Royal Engineers, Transportation: 2nd. Lieut. J. K. Wilkins from Supplementary Reserve of Officers, Royal Engineers (Transportation), to be 2nd Lieut., retaining his present seniority (December 1).

Mr. Otto Jabelmann has been appointed Assistant to the President, in charge of research, of the Union Pacific Railroad. Since July last, Mr. Jabelmann has had the responsibility of this work in his position as Assistant Superintendent of Motive Power, and in this capacity he has handled the design of the 5,400 b.h.p. diesel trains and the main line turbo-electric locomotive.

Mr. W. E. Green, whose appointment as District Superintendent, Leeds, L.N.E.R., was recorded last week, was educated at Dulwich College, and served during the war (1916-18) with a Commission in the Royal Field Artillery. Subsequently, he took the degree of B. Comm. at London University. Mr. Green joined the service of the former North Eastern Railway as a

Mr. W. E. Green

Appointed District Superintendent, Leeds, L.N.E.R.

Traffic Apprentice in 1922, and after amalgamation continued his training in the Scottish, North-Eastern, and Southern Areas. He was appointed Assistant Yard Master, Peterborough, in 1926. Prior to the inauguration of the Central Timing Office, Mr. Green was detailed for special inquiries in the Southern Area (Western Section), and then served in that office. He was again detailed for special inquiries before the establishment of the Central Control, Southern Area (Western Section), in which office he served as Deputy Chief Controller in 1931. In the following year Mr. Green went to King's Cross as Assistant to the District Superintendent, and was appointed full Assistant (the post he has relinquished to go to Leeds) in 1933.

We regret to record the recent death of Mr. Robert Hardie, who, as recorded in our issue of October 1, retired at the end of September from the position of Traffic Manager of the Romney, Hythe & Dymchurch 15-in. gauge railway, with which he had served in that capacity since its opening in 1927. He had previously been Traffic Manager of the

Ravenglass & Eskdale Railway, also of 15-in. gauge.

CHAIRMANSHIP OF GENERAL MANAGERS' CONFERENCE

At the meeting of the General Managers' Conference held at the Railway Clearing House on December 7, Sir Ralph L. Wedgwood, Chief General Manager, L.N.E.R., was appointed Chairman of the conference for the year 1938.

Mr. F. V. Macdonald has been appointed General Manager, Gold Coast Government Railway, in succession to Mr. L. M. Smart, who, as recorded in our issue of October 22, has been appointed General Manager, Federated Malay States Railways. Mr. Macdonald has been Chief Engineer of the Gold Coast system since 1933.

We regret to record the death, on November 23, of Mr. Vernon Percival Gamon, a Director of Nasmyth, Wilson & Co. Ltd., locomotive builders, Patricroft, Manchester.

L.M.S.R. APPOINTMENTS

The following appointments have been approved by the directors:—

Mr. H. W. Moore, Divisional Signal and Electrical Engineer, Glasgow, to be Assistant Mechanical and Electrical Engineer and Signal Engineer, Northern Division, Glasgow.

Mr. G. R. Bradbury, Assistant to District Goods and Passenger Manager, Derby, to be District Passenger Manager, Birmingham.

Mr. W. N. Roberts, Assistant to District Passenger Manager (temporary), Birmingham, to be Assistant to District Goods and Passenger Manager, Derby.

Mr. T. E. Heydon, Senior Clerk (Diagrams, Train Timings and Freight Arrangements Section) Office of Divisional Superintendent of Operation, Derby, to be Chief of Divisional Trains Office, Office of Divisional Superintendent of Operation, Derby.

Mr. P. L. Henderson, Assistant to Chief Carriage and Wagon Outdoor Assistant, Derby, to be Assistant to Works Superintendent for Development, Derby (Carriage and Wagon).

Mr. T. L. Williams, Works Manager, Bromsgrove, to be Assistant to Works Superintendent for Development, Wolverton (Carriage and Wagon).

Mr. T. R. Howard, Chief Inspector (Carriage and Wagon), Derby, to be Works Manager, Bromsgrove.

Mr. R. H. Wilson, Chief Transit and Station Working Clerk, D.G.M.O., Birmingham, to be Goods Agent, Coventry.

Mr. W. E. W. Smith, Clerk, Clothing Stores, Osborne Street, Manchester, to be Resident Storekeeper, Clothing Stores, Osborne Street, Manchester.

Mr. W. Lamont, Controller (Freight Services), Divisional Control Office, Glasgow, to be Assistant District Controller, Motherwell.

Mr. A. L. Fielding, A.M.Inst.C.E., A.M.I.E.E., has been officially gazetted Advisory and Inspecting Engineer for the New South Wales Government in London.

G.W.R. GOLFING SOCIETY

Lord Horne, Chairman of the Great Western Railway, is to be the President of the Great Western Railway (London) Golfing Society, which has just been formed.

Mr. C. R. Dashwood, Assistant General Manager, a well-known playing member of Datchet and Burnham Beeches Golf Clubs, is to be the first Captain. The committee forms an exceptionally strong administration, and is composed of representatives from the various departments at Paddington.

Mr. G. Felix Wilson, of the G.W.R. Architect's Office, is Honorary Secretary.

Lieut.-Col. George Huddleston, C.I.E., V.D., has been elected Chairman of the Assam-Bengal Railway Co. Ltd., in succession to the late Mr. James Rendel, whose death on August 27 was recorded in our issue of September 3. Lieut.-Col. Huddleston has previously been Chairman of H.E.H. the Nizam's Guaranteed State Railways, and Managing-Director of the Assam-Bengal Company. He resigned the latter office in 1934, retaining his seat on the board. Sir Ernest A. S. Bell, C.I.E., has been elected a Director of the Assam-Bengal Railway Company to fill the vacancy on the board caused by Lieut.-Col. Huddleston's appointment as Chairman.

It is with regret that we record the death on November 22 of Mr. Vincent Clements, who, up to his retirement in September, 1929, had served for 36 years as Assistant Secretary and Secretary of the Mansion House Association on Transport.

We regret to record the death on December 4 of M. Jules Michelin, Vice-President and General Manager of the Michelin Tyre Company, which is a pioneer of pneumatic-tyred railcars.

The late Rt. Hon. Henry Givens Burgess, General Manager, L.M.S.R., 1924-27 (see our issue of April 30), left personal estate valued at £20,343 (£20,042 net). Mr. Burgess died on April 23.

We regret to record the death on November 29 of Mr. Edward B. Orme, a Director of the Liverpool Overhead Railway.

It is with regret that we record the death on December 1 of Sir Albert William Wyon, K.B.E., Senior Partner of Messrs. Price, Waterhouse & Company, Chartered Accountants. His firm acts as auditor for the L.M.S.R., L.N.E.R., and Southern Railway Companies, as well as overseas railways, and had an extensive practice with the pre-grouping systems. Sir William Wyon was born in 1869, and entering the City at an early age was articled to Mr. Samuel Lowell Price. He was admitted a partner of the firm in 1895. During the war he was one of the two auditors of the railways while they were under Government control. His talents and experience were further recognised by his appointment as a member of the Board of Referees created by the Treasury under the Finance Act of 1915, and his election as Chairman of the Treasury Committee on the new form of public accounts. Sir William Wyon received the K.B.E. in 1919.

Among those who attended the funeral at Golders Green Crematorium on December 4 were:—

Sir Nicholas Waterhouse; Mr. Ralph G. Davidson (representing the directors and chief officers of the Southern Railway); and Mr. F. W. Turner (representing the Chairman and directors, Railway Clearing House).

East end of Basle station during the past summer (*see page* 1015)

Welsh Inter-Railway Ambulance Competition

The fourteenth annual competition for the "Harry Webb" Challenge Cup, the Welsh inter-railway ambulance trophy, took place at the Assembly Rooms, City Hall, Cardiff, on December 2. The adjudicators were Dr. J. P. J. Jenkins for the team test and Drs. G. S. Phillips and H. B. Pierce for the individual and practical tests. The team test, representing a level crossing accident with a motorcar under conditions of fog, was excellently staged. Six teams, three from the L.M.S.R. and three from the G.W.R., competed. Among the interested spectators were:—

Mr. C. H. Tait, District Goods and Passenger Manager, Swansea, L.M.S.R.; Mr. C. T. Hurry Riches, Divisional Locomotive Superintendent, Cardiff, G.W.R.; Miss C. A. Ault, Ambulance Centre Secretary, G.W.R.; Mr. H. C. Healey, Manchester, L.M.S.R.; and representatives of the St. John Ambulance Brigade.

The Hon. John H. Bruce, Principal Secretary of the Welsh Priory of the Order of St. John, presided over the subsequent proceedings, when he announced the result of the contest as under:—

		Marks
1.	Newport, High Street, G.W.R....	325
2.	Llandudno Junction, L.M.S.R.	319
3.	Barry Loco., G.W.R.	299
4.	Abergavenny Junction, L.M.S.R.	293
5.	Ystalyfera, L.M.S.R.	290
6.	Aberdare High Level, G.W.R....	253

The presentation of the cup and prizes was made by Sir Robert Webber, Commander of the Order of St. John, and a Director of the *Western Mail*, who paid high tribute to the work of railway-trained ambulance men.

L.N.E.R. Secretary's Departmental Dinner

In the regretted and unavoidable absence, owing to indisposition, of Mr. James McLaren, Mr. P. J. Dowsett, Assistant Secretary, presided at the fourteenth dinner of the Secretary's Department of the London & North Eastern Railway at the Great Eastern Hotel, Liverpool Street, on Tuesday evening last. About 900 members of the department were present, including representatives from Newcastle and Edinburgh as well as a number of the retired staff. Among the guests were Mr. R. J. M. Inglis, Engineer; Dr. C. Grant MacMahon, Medical Officer; Mr. W. R. Mole, Assistant Solicitor; and Mr. G. F. Thurston, late Divisional General Manager, Southern Area.

Mr. A. G. Stephens, in submitting the toast of the London & North Eastern Railway, referred to the increases in the company's traffics but pointed out that these unfortunately would be offset to some extent by large increases in cost of materials, and similar expenses. He trusted that the present improvement would be maintained and so enable the less fortunate of the stockholders to benefit from increased dividends, and the staff generally to receive some reward for their assiduous efforts. Dr. MacMahon suitably responded on behalf of the company.

The Chairman gave the toast of "Our Guests," to whom, on behalf of Mr. McLaren and the company present, he extended a very cordial welcome. He felt deeply sorry for the cause of Mr. McLaren's absence and the necessity of his having to deputise that evening. In responding, Mr. Thurston expressed his own and his fellow guest's appreciation of the hospitality accorded them; and the pleasure he felt in meeting again so many of his old colleagues of the Secretary's Office.

Captain F. H. H. Thomas proposed the toast of "The Chairman" and paid tribute to his sterling qualities and to the interest he showed in the welfare of the staff. Mr. Dowsett, in acknowledging, expressed the Secretary's and his own appreciation of the assistance rendered always by all members of the staff, and read a message received from Mr. McLaren to that effect, and expressing the disappointment he felt at his inability to be among them.

L.M.S.R. Divisional Operating Dinner

A large gathering of officers and staff assembled at Crewe Arms Hotel on December 3 for the fourteenth annual dinner of the staff of the Divisional Superintendent of Operation, Western Division, L.M.S.R. Many departments of the service were represented, and visitors had journeyed from Euston, Derby, Manchester, Preston, and elsewhere in order to be present. Mr. S. E. Parkhouse, Divisional Superintendent of Operation, Crewe, was in the chair.

Mr. R. F. Tucker proposed the toast of "The L.M.S.," and reviewed operating progress since 1929, when the long non-stop runs of the Royal Scot between Euston and Carnforth were introduced—at first with two small engines and later in the same year with the famous "Royal Scot" 4-6-0's. Discussing matters of personnel, Mr. Tucker referred to the Railway Staff College now under construction at Derby, where young railwaymen of promise would be trained to use their talents for the best results. He also paid tribute to drivers, firemen, guards, signalmen, shunters and all others, especially those at the outposts of the L.M.S.R.—they too were a part of the life blood of a great organisation.

Mr. C. R. Byrom, Chief Operating Manager, replying to the toast, agreed with Mr. Tucker that the Coronation year had been one of great railway achievement. But while the railways were doing fine work, the public was still demanding more, and he urged all staffs concerned—inside and outside—to greater things. He was confident the staff at Crewe, under Mr. Parkhouse, would rise to that demand.

Mr. A. R. Thomson, proposing "The Visitors," said it was gratifying that personal contact could be maintained between officials and staff in so great an organisation as the L.M.S.R.

Mr. E. J. H. Lemon (Vice-President) responded for the guests. Crewe, he said, was a name which represented railway practice of the highest degree, and he was pleased that Major H. P. M. Beames, a representative of the old Crewe tradition, was among the company.

Mr. S. F. Green proposed "The Chairman," and Mr. Parkhouse, responding, paid a tribute to the loyalty of his staff. A smoking concert was held after the dinner.

Among the visitors were:—

Messrs. E. J. H. Lemon, C. R. Byrom, S. H. Fisher, F. A. Pope, H. P. M. Beames, F. A. Lemon, R. C. Bond, W. Land, F. W. Abraham, Dr. H. E. Moore, R. E. Bullough, H. E. Morgan, and A. Allmark.

Railway Exhibition in Moscow

"Twenty Years of Railway Transport" is the title of an exhibition opened in Moscow on November 18, at the Kazan railway station. Numerous models, diagrams, photographs, and painted panels trace the development of the railway system in Soviet Russia since the establishment of the Soviet regime. The visitor learns that during the period 1836 to 1917, *i.e.*, in more than 80 years, pre-revolutionary Russia built 36,350 miles of railways, and that during the last twenty years, under the Soviets, 16,530 miles of railways were built. A large electrically-lighted map shows railway construction in the country during the last hundred years. Special interest attaches to the section at the exhibition showing models of the new locomotive with tender-condenser, electric locomotives, &c. Actual locomotives, shunted on to one of the lines inside the Kazan station, may be inspected by visitors. Models are also on view of the carriage repair shops, 218 of which were built in the last two years, and of the shops where automatic brakes are repaired and tested. In a special historical section of the exhibition are shown models of the world's early steam engines and railway carriages, and material relating to the development of railway transport in Russia and other countries. We referred briefly to the Russian railway centenary in a news article on page 797 of our issue of November 5 last.

FURTHER SWEDISH ELECTRIFICATION.—Electric traction was inaugurated on the Upsala-Gävle line of the Swedish State Railways on Tuesday last, December 7.

Progressive diagrams of tunnel construction—erection of supporting columns; arrangement of sheet-steel piling and shoring; and encasing of completed steelwork in concrete

Cross-section of six-track tunnel, and parallel drainage and ventilation duct; and (top right) part longitudinal section

THE BRUSSELS NORD-MIDI JUNCTION RAILWAY (see article opposite)

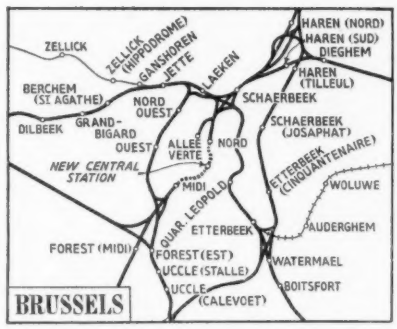
The Brussels Nord-Midi Junction Railway

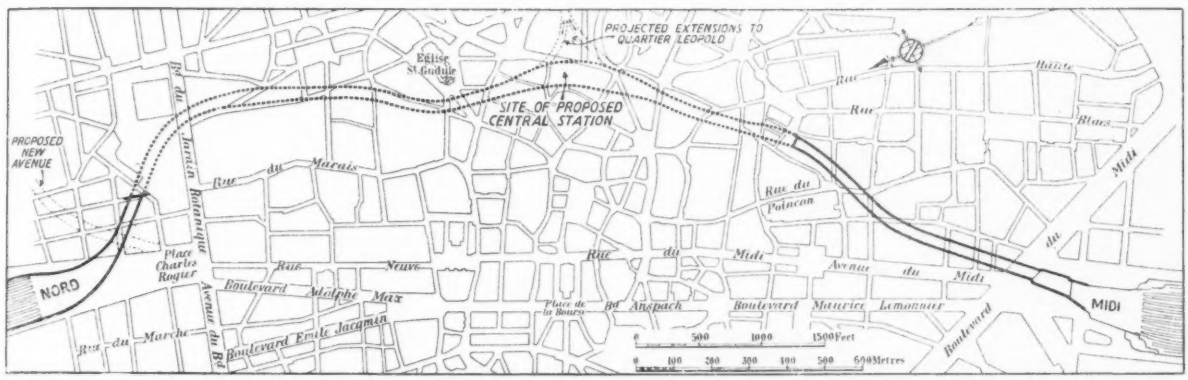
An article in our issue of February 21, 1936, outlined the plans adopted by the Belgian Government for the proposed junction line linking the Nord and Midi stations in Brussels; and also recorded the formation of the Office National pour l'Achèvement de la Jonction Nord-Midi to take all steps necessary for realising the scheme. Further details of the work and plans at the present time were given in a paper read to the Permanent Way Institution by Mr. Roy V. Hughes on December 8, under the title of "The form and function of the Railway in the City of the Future."

The new line will leave the Midi station on a viaduct of about 2,078 yd., enter a tunnel of 2,130 yd., and reach Brussels Nord on a second viaduct of 219 yd. Work is now in progress on the tunnel which will accommodate the six lines of the junction railway. A parallel duct will be provided for drainage and ventilation. Although the line will be electrified, a large number of steam locomotives will use the tunnel at first, and the ventilation is planned with this in view. There will be three stations in the tunnel—Halte Centrale, with platforms served by all six lines; and, on the two eastern tracks (to be used by Brussels-Antwerp trains), stations adjacent to the Colonne du Congrès, and to the church of Notre Dame de la Chapelle. Following the course of the tunnel, a new direct boulevard will be constructed to link the Nord and Midi stations, affording relief to road traffic on the central boulevards in the rush hours. The Office National pour l'Achèvement de la Jonction Nord-Midi (known for brevity as the O.N.J.) owns considerable property along the route of the new railway, and the replacement of old buildings demolished during construction is an important element of the scheme. An underground garage covering about 1¼ acres is shortly to be provided immediately above the tunnel between the Place de Dinant and the Rue de l'Hôpital.

Alterations to the present Nord and Midi terminals will be as follow. Brussels Midi, where passenger trains will be marshalled and originate, is to have 22 platform lines, 12 of them for through traffic. Brussels Nord will be a through station entirely, having 12 platform lines. Only two short connecting spurs between existing lines will be necessary to bring trains at present using the Quartier Léopold station into the new Brussels Midi. As 70 per cent. of Belgian passenger traffic originates within a radius of 30 miles from Brussels, the electrification of the whole of this zone is contemplated, and the provision of a frequent, fixed-interval train service. In these circumstances, the passage of 800 trains daily over the Nord-Midi junction line is estimated.

The tunnel is being built by cut-and-cover in an excavation 115 ft. wide. The eastern and western sides of the excavation are bounded by steel sheet piling, and steel shoring is erected in such a way that it forms the framework for the reinforced concrete of the completed tunnel. On account of the width of the tunnel, five supporting columns for the shoring have had to be provided transversely at intervals, and these are already in place. The foundations for these columns were sunk as a preliminary to making the excavation. For this purpose shafts were excavated to a depth of 5 ft. below the floor level of the tunnel. The columns were then erected exactly in their final positions, standing on concrete blocks cast in the bottom of the shafts. Erection of the rest of the steelwork proceeds gradually, in sections of 78 ft. 9 in. at a time, and deepening of the cut is safely carried on thanks to the placing in position of the shoring at successive stages of the excavation. So far, 164 yd. of the tunnel have been completed.





Sketch map of the course of the Nord-Midi Junction Railway, Brussels, now under construction; and (above) the connecting line in relation to other railways in the Brussels area

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U.S.A. Car Loadings Peak at 845,000.—Although the New York Stock Market at the time of writing has recovered strongly from the depth it reached on October 18, the precipitous decline has had a depressing effect on all business, including railway traffics. Freight car loadings in the week ended October 9 totalled 815,000, a decline of 32,000 from the previous week, thus marking the latter, with loadings at 847,000, as the seasonal peak. Earlier in the year the railways had expected that the autumn peak would exceed 900,000 cars, so realisation fell short of expectation by approximately 6 per cent. Now the weekly carloadings are running fractionally lower than those of comparative weeks in 1936.

Glyn Valley Tramway Co. Ltd.—Mr. G. H. Haswell, the Liquidator of this company, has given notice that general meetings of the creditors and of the shareholders will be held on January 7 next at 26, Nicholas Street, Chester, to receive the account of the liquidator showing how the voluntary winding up of the company has been conducted and its property disposed of.

Two Years' Results with the Silver Jubilee

(*See editorial note on page* 1007)

The popularity and reliability of high-speed passenger transport are strikingly evidenced by some particulars of the running of the Silver Jubilee express, for which we are indebted to Mr. V. M. Barrington-Ward, Superintendent, Western Section, and to Mr. A. H. Peppercorn, Locomotive Running Superintendent, Southern Area, L.N.E.R. After the trial run of September 27, 1935, when with the first of the streamlined "A4" Pacific locomotives—No. 2509, *Silver Link*—a maximum speed of 112½ m.p.h. was twice reached, and British records still unbeaten were established by covering 43 miles at an average of 100 m.p.h. and 70 miles at 91.8 m.p.h., the train of seven vehicles has remained continuously in service from the public inauguration of the Silver Jubilee on September 30, 1935, until it was taken out of traffic for general overhaul, and temporarily replaced by the spare Coronation set of cars, on October 9, 1937.

During this period of just over two years, the only interruptions in the running of these cars have been for two days at each week-end, for eleven days at Christmas, 1935, five days at Easter, 1936, ten days at Christmas, 1936, five days at Easter, 1937, and five days at August Bank Holiday, 1937, together with three separate occasions (in February and March, 1936, and April, 1937) when the train set has been out of service for a single day owing to some minor defect requiring attention. It was then replaced by a set of standard main-line coaches. On one occasion only in the two years—the stoppage of April, 1937—was the Silver Jubilee stopped *en route* for a casualty (a hot box) to one of the coaches. The Christmas, Easter and August Bank Holiday breaks in each year were used to run the train to Doncaster works for inspection and any adjustment or renovation that might be necessary.

During these two years of continuous service the Silver Jubilee has made 517 return journeys, covering 277,370 miles. Of this total, 230,200 miles (between London and Darlington in each direction) have been at a scheduled speed of 70·4 m.p.h. from start-to-stop, and 162,030 miles have been run at a scheduled average of 75·0 m.p.h. The daily mileage has been 537 between London and Newcastle; 465 miles of this has been booked at over 70 m.p.h., and 314 miles at 75 m.p.h. each day. The amount of coal burned by the locomotives during this period has been 4,654 tons, which works out at an average of 37·6 lb. per mile—a remarkably low figure in view of the demands on tractive power made by these sustained speeds. Three locomotives—Nos. 2509, 2510, and 2512—have borne the brunt of the haulage, the fourth of the four specially built for this service, No. 2511, having been kept as a spare engine at Gateshead, normally working on other trains between Newcastle, Edinburgh, and York, except when required for the Silver Jubilee duty. The appearance of other engines on this turn has been extremely rare, though time has been kept with non-streamlined "A3" Pacifics. Throughout the 517 days of operation, the percentage of punctual arrivals going down has been 71·8 and coming up 67·9 per cent.; the average late arrival going down has been 2·5 min., and coming up 1·7 min., but if exceptional delays be omitted, such as occasional blockages of the line by derailments, engine failures, and so on, the average late arrival comes down to 1·4 min. in each direction on the 4-hr. journey. This average covers all descriptions of weather, including fog. Responsibility for working the Silver Jubilee has been throughout in the hands of ten sets of enginemen at King's Cross shed, Southern Area.

The passenger complement has totalled 25,492 first class and 49,129 third class going north, and 18,844 first class and 48,833 coming south—a grand total of 142,298 passengers. This works out at an average of 145 per northbound trip (which is practically the full capacity of the train, in view of the fact that a proportion of the restaurant car space is reserved for the service of meals), and 131 coming south. The value of the supplementary fares thus paid for the use of the Silver Jubilee over two years is £25,780, or almost exactly three-quarters of the first cost of the train. On the up journeys 39,133 luncheons have been served, and on the down journey 39,002 dinners, together with 9,035 sundry meals; the total of 87,170 meals works out at an average of 169 per day, or 61 per cent. of the passenger complement. The London & North Eastern Railway thus has every cause to be satisfied with the success of this first experiment in high-speed travel in Great Britain.

Staff and Labour Matters

Hours of Road Motor Drivers

The joint council for the retail distributive trades section of the road transport industry has made an application to the Minister of Transport for an Order varying the hours of drivers during the Christmas, 1937, trading period. The variation applied for is to the effect that the period of eleven hours laid down in Section 19 (1) (ii) of the Road Traffic Act, 1930, may be increased to twelve hours on not more than two days in each of the three weeks ending on December 18 and 25, 1937, and January 1, 1938, the variation to apply only to those engaged in the delivery of goods from retail shops and/or stores to their customers. The application has been referred to the Industrial Court, before which it will be heard on Wednesday, December 15.

Engineering Apprentices' Wages

At a meeting at York on Wednesday, December 1, the Joint Engineering Trade Union movement considered the joint recommendation of the Engineering and Allied Employers' National Federation and the unions affiliated to the joint movement for dealing with questions arising concerning apprentices, boys, and youths, in the engineering industry. The meeting decided that the recommendations should be remitted to the executives of the unions concerned, and their replies are to be received at a meeting at York on December 23.

OFFICIAL OPENING OF MEGHNA BRIDGE, ASSAM-BENGAL RAILWAY.—A Reuters message from Chittagong states that this bridge was opened on December 6 by Sir Guthrie Russell, Chief Commissioner of Railways in India. It was described and illustrated in our issue of July 30 and also in our recent Overseas Special Number. Sir Guthrie also gave it the name of the "King George VI Bridge." The King, he said, had been graciously pleased to allow his name to be associated with the bridge, which, he believed he was correct in saying, was the largest and most important bridge to be completed within the Empire during Coronation year. The estimates were sanctioned by the Government of India in April, 1935, but work was not begun until the following November, so that the bridge has been completed in two years.

BRIGHTENING L.N.E.R. LONDON TERMINI.—Good progress is being made by the L.N.E.R. in brightening certain London terminal stations and improving the amenities. It has now been decided to instal a snack bar at Liverpool Street. This is to be designed on entirely modern lines with a view to the rapid service of light meals in bright surroundings. A counter with 26 pedestal stools will be provided and there will be easy access from the adjoining thoroughfare of Bishopsgate. At King's Cross illuminated canopies are to be provided over the entrances to the dining room and tea room, and the new style of window frame as used in the enquiry office is to be fitted so as to harmonise the general appearance of the premises adjacent to No. 10 platform. Reference to station-brightening was made in our August 6 issue.

QUESTIONS IN PARLIAMENT

British Investments in Brazilian Railways

Mr. R. De La Bere (Evesham—C.) on December 1 asked the Secretary of State for Foreign Affairs whether he would notify the Brazilian Government that the United Kingdom could obtain adequate supplies of fruit from overseas British sources, and that a complete embargo would be imposed upon the importation into the United Kingdom of Brazilian fruit unless arrangements acceptable to the British Government were arrived at about Brazilian loans held here and British investments in the Leopoldina and other Brazilian railways.

Mr. R. A. Eden (Foreign Secretary): I would refer my hon. friend to the reply given to the hon. member for Lincoln on November 29, which defines the views of His Majesty's Government on the points raised by my hon. friend and to which I have nothing to add.

Anglo-Argentine Railways

Sir Nicholas Grattan-Doyle (Newcastle-upon-Tyne North—C.) on December 1 asked the Secretary of State for Foreign Affairs whether his attention had now been drawn to the observations on the position of the Anglo-Argentine Railways in the Department of Overseas Trade Report, No. 683, June, 1937, of His Majesty's Commercial Secretary at Buenos Aires; and whether, in view of these observations, he would now ask the Argentine Government for a considered reply upon those observations, as the treatment of British investments in Argentina was causing such bad feeling here that it might prevent a renewal of the meat agreement with Argentina's best customer. He also asked the Secretary of State for Foreign Affairs if he would draw the attention of the Argentine Government to Report No. 683 of His Majesty's Commercial Secretary at Buenos Aires, which showed that for the past 35 years the average return on £227,000,000 sunk in the Anglo-Argentine railways, including debentures, had been 3¾ per cent. per annum, and in 1936 1½ per cent., and also to the fact that much of this low rate of income had been wiped out by loss of the capital; and would he inform the Argentine Government that a trade agreement was valueless to us if the export trade arising from British loans to Argentina resulted in the loss of British savings.

Mr. R. A. Eden (Foreign Secretary): I have no doubt that the Argentine Government is fully aware of the facts set out in the report to which my hon. friend refers. As I have repeatedly stated in answer to questions to my hon. friend and other hon. members, it is the view of His Majesty's Government that the solution of the present difficulties experienced by British railways in the Argentine is in the first place a matter for negotiation with the Argentine Government by the companies concerned, who are perfectly well aware that I am always ready to consider sympathetically any request for assistance that they may wish to make. I do not think that the companies themselves would welcome intervention at the present stage by His Majesty's Government on the lines suggested by my hon. friend.

Sir Frank Sanderson (Ealing—C.): Is it not a fact that the present Government in Argentina are giving more favourable consideration not only to railways but to British financial interests in the Argentine?

Mr. Eden: I think that is so.

Railway Trucks from the Continent

Sir Gifford Fox (Henley—U.) on December 7 asked the Minister of Transport if he could state the number of railway trucks of British or Continental origin which entered or re-entered this country from countries where foot-and-mouth disease existed; the manner of packing the goods in these trucks; and what regulations were enforced on re-entry to ensure rigid inspection of the material in which the goods were packed.

Dr. Leslie Burgin (Minister of Transport): I am informed by the railway companies concerned that the number of railway wagons which arrived in this country by the Dover-Dunkirk and Harwich-Zeebrugge train ferries during the month of October last was 1,870 and that the requirements of the Foot-and-Mouth Disease (Packing Materials) Orders, 1925 and 1926, are strictly complied with.

King's Cross Underground Station

Mr. W. Thorne (Plaistow—Lab.) on December 8 asked the Minister of Transport whether he was aware of the obstructions in the road in connection with the re-building of the underground station at King's Cross and that these conditions were likely to continue for a year or more unless some alterations were made; and what action he intended taking about the matter.

Dr. Leslie Burgin: I understand from the Commissioner of Police that by arrangement with the highway authority and the London Passenger Transport Board everything possible is being done to expedite this work and to reduce the inevitable inconvenience to the public.

Roads Alongside Railways

Lieutenant-Commander Tufnell (Cambridge—U.) on December 8 asked the Minister of Transport whether he had given consideration to the possibility of easing the congestion on certain roads by the construction of additional roads alongside the railways where there was land available; and whether he would undertake to review this matter in detail during the coming year.

Dr. Leslie Burgin: In examining the possible siting of new roads, the suggestion of my hon. and gallant friend is one of the many considerations which must always be borne in mind by my advisers.

Parliamentary Notes

L.N.E.R. Bill

The Bill which is being promoted by the London & North Eastern Railway Company will provide for the construction of three widenings on the London-Sheffield main line: at Whetstone in Leicestershire (1 fur. 7½ chains), in the rural district of Barrow-upon-Soar in Leicestershire (4 fur. 4 chains), and at Hucknall (Notts), (1 fur. 1½ chains). It proposes also to sanction a lengthening and a raising of the level of a bridge near Ilford carriage sidings, a lengthening and deviation and a raising of the level of a bridge near Goodmayes East signal box, a widening of a bridge near Epping, and a lengthening of a bridge in Sheffield. Level crossings are proposed to be stopped up in Leyton, Wanstead, Woodford, Chigwell, and Theydon Bois. The Bill contains powers for the compulsory acquisition of lands at numerous places, and provisions prohibiting trespass and the throwing of rubbish upon the railways, stations, works, or premises of the company.

Brighton Corporation (Transport) Bill

The Brighton Corporation is promoting a Bill to confirm an agreement between the Brighton Corporation and the Brighton, Hove & District Omnibus Co. Ltd. for the provision and working in co-ordination of passenger road transport and the sharing of the revenues thereof; to confer powers upon the corporation and the company in connection with the running of trolley vehicles; to enact provisions with respect to the abandonment by the corporation of its tramways and with respect to Volk's Electric Railway; and to empower the corporation to borrow money.

INSTITUTE OF METALS PROGRAMME OF MEETINGS.—The Institute of Metals has issued its annual programme of meetings for the session 1937-38. The 30th autumn meeting will be held, jointly with the Iron and Steel Institute, in the United States of America. The programmes of the six local sections include numerous lectures; papers cover such subjects as "Metals used in Railway Work," "Non-Ferrous Welding," and "Some Researches into the Mechanism of Corrosion." Copies of the programme may be obtained from the Secretary, Mr. G. Shaw Scott, 36, Victoria Street, S.W.1.

French National Railways Organisation

The appointments for the administration of the French National Railways Company, into which all the main-line undertakings are to be merged on January 1, have been announced. As was recorded in our issue of September 3, the board of the new company will at first consist of 33 members, including 12 members nominated by the present systems. Under the general management there will be five regional managers in charge of the following divisions of the system: Northern Region (comprising the former Northern Railway); Eastern Region (Eastern, and Alsace-Lorraine Railways); South-Eastern Region (P.L.M. Railway); South-Western Region (P.O.-Midi Railways); and Western Region (State Railways). Every region will have its own operating, rolling stock, and way and works departments. The appointments announced this week were as follow:—

Conseil d'Administration

President, M. Guinand (Premier Président de la Cour des Comptes). Vice-Presidents, MM. Grimpret (formerly Secrétaire Général, Direction Générale des Chemins de fer, Ministère des Travaux Publics), and Marlio (formerly President, Eastern Railways). Members: the Vice-President of the Conseil d'Etat; MM. Pierre Fournier (Gouverneur de la Banque de France), Henri Deroy, Directeur Général de la Caisse de Dépôts et Consignations; Grunebaum-Ballin, Conseiller d'Etat; Tony-Bouffandeau, Maitre des Requêtes au Conseil d'Etat, Directeur du Cabinet du Président du Conseil, Membre de la Commission des Marchés des Grands Réseaux; Toutés, Máitre des Requêtes au Conseil d'Etat; Paul Devinat, Inspecteur Général de l'Enseignement Technique, Directeur du Cabinet du Ministre des Travaux publics, Secrétaire Général du Comité Supérieur de Co-ordination des Transports, Administrateur du Port Maritime de Bordeaux; Bourgier, Conseiller d'Etat, Directeur du Contrôle financier et des Participations Publiques; Jacques Rueff, Inspecteur des Finances, Directeur du Mouvement Général des Fonds, Commissaire du Gouvernement près la Banque Nationale Française du Commerce Extérieur, représentant l'Etat au Conseil de la Compagnie du Nord; Marc Clapier, Conseiller Référendaire à la Cour des Comptes, Directeur du Cabinet du Ministre de la Défense Nationale; Aron, Inspecteur Général des Ponts et Chaussées, Inspection du Contrôle V.F.I.L.; Galliot, Conseiller d'Etat en service extraordinaire, Inspecteur Général des Mines, Directeur des Mines au Ministère des Travaux publics, Office de l'Azote, Mines domaniales de potasse d'Alsace; Crescent, Inspecteur Général des Ponts et Chaussées, Directeur des Voies Navigables et des Ports Maritimes au Ministère des Travaux Publics; Théodore Tissier, Vice-Président Honoraire du Conseil d'Etat, Président du Comité consultatif des Chemins de fer; Raoul Dautry, Directeur Général Honoraire des Chemins de fer de l'Etat.

Members nominated by railway companies. Nord — MM. Mayer, Getten, Pierre Thiriez; P.L.M. — MM. Goy, Laurent-Atthalin, Peschaud; Est—M. de Tarde; P.O.—MM. Fredault, Barres; Midi—MM. Tirard, Moreau-Neret.

Nominated by Confederation Générale du Travail—MM. Jarrigion, Chef de train Honoraire; Semard, commis honoraire; Liaud, employé principal *in partibus;* Jacquet, Inspecteur Divisionnaire Trafic *in partibus.*

The following attend the meetings of the board: MM. Le Besnerais, Surleau, Claudon, Rendu, Filipi (see below).

Administrative Board

President, M. Guinand; Vice-Presidents, MM. Grimpret, and Marlio; Members (representing the State), MM. Alexandre Aron, Tony-Bouffandeau, Paul Devinat, Jacques Rueff.

General Management

General Manager, M. Le Besnerais; Assistant General Manager, M. Surleau; General Secretary, M. Filippi. Mouvement, M. Goursat (formerly Nord); Matériel et Traction, M. Jean Lévy (formerly Etat); Installations Fixes (Voie), M. Porcher (formerly State Railways); Service Commerciale Autonome, M. Boyeau (formerly P.L.M.); Service du Personnel, M. Barthe (formerly Est); Service des Finances et de la Comptabilité, M. Brochu (formerly P.L.M.); Service des Commandes et Approvisionnement, M. Leclerc du Sablon (formerly P.O.-Midi); Service de l'Organisation Technique, M. Dumas (formerly Nord).

Regional Managers

Northern, M. Cambournac; Eastern, M. Renard; South-Eastern, M. Jourdain; South-Western, M. Epinay; Western, M. Legoux.

Forthcoming Events

Dec. 10 (*Fri.*).—Institute of Transport (Newcastle), at Royal Station Hotel, 7.30 p.m. "Whaling in the Antarctic," by Mr. C. Lander.

Institute of Transport (Newcastle Graduate), at Royal Station Hotel, 6 p.m. "Coal Shipments," by Mr. A. Earley.

Institute of Welding (Midlands), at James Watt Inst., Newhall Street, Birmingham, 7.30 p.m. "Working Data on the Cutting of Steel by the Oxygen Jet," by Messrs. N. Daniel and C. Durant.

Permanent Way Institution (South Wales), at South Wales Inst., Cardiff. "Permanent Way for High Speed," by Mr. W. A. Willox.

Railway Club, at Broad Street Station Restaurant, London, E.C.2, 7.30 p.m. Annual Dinner.

Railway Students' Association (Edinburgh), at Goold Hall, St. Andrew Square, 7.30 p.m. "British Railways in Retrospect, 1932-37," by Mr. K. Fenelon.

Dec. 11 (*Sat.*).—Permanent Way Institution (Manchester-Liverpool), at Victoria Station, Manchester, 3 p.m. Election of Officers, 1938.

Stephenson Locomotive Society (London), at King's Cross Station, L.N.E.R., 2.30 p.m., Annual General Meeting. Annual Dinner at St. Ermin's Restaurant, Broadway, S.W.1, 6.15 for 6.30 p.m.

Dec. 13 (*Mon.*).—Engineers' German Circle, at Inst. of Mechanical Engineers, Storey's Gate, London, S.W.1, 6 p.m. "Die Entwicklung Der Legierten Werkzeug-Und Konstruktionsstähle In Den Letzten Jahren In Deutschland (Recent Developments in Steel Alloys for Machine Tool and Engineering Work in Germany)," by Dr. Scherer.

Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 5.30 p.m. Annual General Meeting. "The Economic Future of Waterways," by Mr. G. Cadbury.

Institute of Transport (Scottish), at North British Hotel, Edinburgh, 7.15 p.m. Discussion by Messrs. R. Broomfield and K. Scott.

Institution of Automobile Engineers (Derby), at Technical College, 7.30 p.m. "Rubber in Automobiles," by Mr. C. Macbeth.

Stephenson Locomotive Society (Scottish), at Royal Technical College, George Street, Glasgow, 7.30 p.m. "Modern Locomotives of the Southern Railway," by Mr. J. Clayton.

Dec. 14 (*Tues.*).—Institute of Transport (Birmingham), at Queen's Hotel, 6 p.m. "Commercial Air Transport," by Mr. G. Waters.

Institution of Automobile Engineers (Coventry), at King's Head Hotel, 7.30 p.m. "Transmission Gear Developments and the Possibilities of Simplified Controls," by Mr. L. Shorter.

Permanent Way Institution (Brighton), at Locomotive Mess Room, New England Street, 7 p.m. "Concrete Practice and its Application to Railway Construction," by Mr. R. Blyth.

Permanent Way Institution (Sheffield), at Royal Victoria Hotel, 7 p.m. "Compressed Air and a Few of its Applications," by Mr. E. Hancock.

Dec. 15 (*Wed.*).—Institution of Automobile Engineers (Leeds), at Metropole Hotel, 7.15 p.m. "Steering Problems and Layout," by Mr. D. Bastow.

Institution of Civil Engineers, Great George Street, London, S.W.1, 6 p.m. "Electrical Peak Loads and Methods of Dealing Therewith, with Special Reference to Hydraulic Storage," by Mr. R. Mountain.

Institution of Locomotive Engineers (London), at Inst. of Mechanical Engineers, Storey's Gate, S.W.1, 6 p.m. "A Description of Two Experimental Passenger Locomotives Built for the Indian State Railways," by Mr. H. Saunders.

Dec. 15–18.—Manchester Model Railway Society, at Albert Hall, Peter Street. Annual Exhibition.

Dec. 16 (*Thurs.*).—Institution of Electrical Engineers, Savoy Place, London, W.C.2, 6 p.m. General Discussion: "Electrical Engineering Education."

Institution of Locomotive Engineers (Scottish), at Royal Technical College, George Street, Glasgow, 7.30 p.m. Graduates' Papers.

Institution of Structural Engineers (London), at Inst. of Civil Engineers, Great George Street, S.W.1, 6.30 p.m. "Some Principles of Law Relating to Conditions of Contract," by Mr. B. Kehoe.

Permanent Way Institution (Nottingham-Derby), at Bridgeway Hall, Nottingham, 7.15 p.m. "Tonbridge Alterations," by Mr. L. Catchpole.

INSTITUTION OF RAILWAY SIGNAL ENGINEERS.—At a meeting in London on December 8, Mr. A. J. Golding, Member, read an instructive paper entitled "Relay Interlocking." In the discussion the following took part: Mr. C. Carslake (by communication), Messrs. R. Dell, H. H. Dyer, F. R. Addis, A. Brown, R. J. Purves, J. H. Currey, J. H. Fraser, A. Moss, T. T. Eldridge, G. C. Thew, L. J. Boucher, and the President, Mr. H. M. Proud. The next meeting is to be held on January 26, when a paper on "Signalling in New Zealand" will be given by Mr. G. W. Wyles, Signal and Electrical Engineer, New Zealand Railways. The Institution has this month completed the twenty-fifth year since its incorporation.

NOTES AND NEWS

L.M.S.R. 1938 Rolling-Stock Programme.—Details are given on our Contracts and Tenders page this week of the L.M.S.R. £1,000,000 rolling stock programme for 1938 which provides for a total of 110 new locomotives, 732 coaching and 9,715 freight vehicles.

Mexican Department of Railways.—General Cardenas, President of Mexico, has issued a Decree creating a Department of Railways in that country. This action is the sequel to the nationalisation of the Mexican railways that becomes effective today, December 10.

Speed Record in Italy.—The Italian State Railways claim that an electric train conveying French railway engineers attained a top speed of 201 km.p.h. (126 m.p.h.) on the Direttisima line between Rome and Naples. The average speed for the whole distance of 134 miles was said to have been 94 m.p.h.

Leeds Memorial to Dr. Samuel Smiles.—On December 4 a bronze commemorative tablet to Dr. Samuel Smiles was unveiled at Zion School, Leeds, where he was a teacher from 1842 to 1847. Dr. Smiles was one of the founders of *The Railway News*, and his railway work was noticed in a leader on page 544 of our issue of October 1 last.

Railway Benevolent Institution.—The Railway Benevolent Institution Casualty Fund collection is now being made. 1s. subscription secures a return of about 3s. 6d. a week whilst disabled by accident (£5 maximum), £5 to the widow of a member killed, and £3 to the widow of a member dying from natural causes during the year of membership. Benefits are paid irrespective of other income. Subscriptions will be received by any stationmaster or agent, from whom particulars are available.

Railway Rates Tribunal.—The tribunal will sit on Tuesdays, January 18, February 15, March 15, April 12, May 10, June 14, July 12, October 18, November 15, and December 13, 1938, to hear applications as to the granting of new or the reduction of existing, exceptional rates. The Court will also sit on Tuesdays, January 25, April 26, July 19, and October 25, 1938, to hear applications referring to classification; applications as to the reductions to be made from standard charges where damageable merchandise is carried under owner's risk conditions; and applications as to rebates under the Railway Freight Rebates Scheme.

Buenos Ayres Western Railway Notes.—The directors of the Buenos Ayres Western Railway are giving holders of the company's £600,000 four per cent. three-year bearer notes (1934) which mature for payment on January 1, 1938, an opportunity to extend 75 per cent. of the nominal value of each note held for a further three years. Noteholders accepting this offer will receive on January 1, 1938, a cash payment of £1 17s. 6d. for each £100 of notes, representing discount at the rate of 2½ per cent. on the portion to be extended, and will also be paid in cash 25 per cent. of the nominal value of each note to be extended.

French Railwaymen's Visit to Spain.—A delegation of French railwaymen is at present in Madrid, on a visit to their colleagues in Spain, by special invitation from the railway section of the U.G.T., or General Workers' Union. The delegates paid a special visit, escorted by Spanish railwaymen, to the headquarters and to some of the outposts of the 14th International Brigade defending Madrid.

Metropolitan Line Train Derailed at Aldgate.—On Wednesday, December 8, the 7.15 a.m. Metropolitan line train from Barking to Hammersmith was derailed owing to a broken axle at Aldgate. Services on the Inner Circle, Barking-Hammersmith, Aldgate-Harrow, Aldgate-Watford and the Aylesbury line routes were disorganised for some hours. Metropolitan trains were reversed at Moorgate, Whitechapel, and Mansion House, and the City service from the main line was stopped at Baker Street. Normal working was resumed during the afternoon.

Great Western of Brazil Railway.—The directors announce that, in connection with a proposed moratorium on the 4 per cent. debentures, a question has been raised as to the relative priority of the 6 per cent. permanent debenture stock and the 4 per cent. debentures to bearer. Legal advice has been sought, and in the face of the available documents, it is more than doubtful whether, in strict law, the 6 per cent. permanent debenture stock has the priority, which, since its issue in 1880, has, in good faith, been assumed. Further consideration is immediately being given to the situation with a view to formulating proposals to deal therewith.

New Station for Sloane Square.—The London Passenger Transport Board has placed a contract with W. & C. French Limited for rebuilding Sloane Square station, which was opened in 1868 as part of the second section of the District Line and retains some of the atmosphere of the time, especially in the buffet, which is almost a museum piece. The first step in the reconstruction will be to clear the old shops on the Sloane Square frontage. Excavations will then be sunk to the platform level outside the existing station walls. New retaining walls will be built and girders erected over the tracks. It will then be possible to enlarge the existing tunnel so that the platforms can be made about 25 yd. longer. The stairs leading down to the platform will be reconstructed in easier flights and "up" escalators will be provided. On the street level there will be a spacious ticket hall with a central ticket office, a modern buffet, and new rooms for men and women. The entrance to the ticket hall will be from the middle of the Sloane Square frontage.

Collision at Valencia.—A Reuters message from Valencia states that twenty persons are known to have been killed and several injured when a ten-coach steam passenger train approaching from the Central of Aragon line, crashed into a two-car electric train just outside Valencia station on December 4.

Canadian Pacific Earnings.—Gross earnings of the Canadian Pacific Railway for the month of October, 1937, amounted to $14,729,000, an increase of $480,000 in comparison with October, 1936. In the working expenses of $10,450,000 there was an increase of $604,000, leaving net earnings $124,000 lower, at $4,279,000. Aggregate gross earnings for the first ten months of 1937 were $119,831,000, an improvement of $5,638,000, and the net earnings of $17,353,000 were higher by $1,122,000.

Canadian National Earnings.—For the month of October, 1937, gross earnings of the Canadian National Railways amounted to $19,328,357, an increase of $542,079 in comparison with October, 1936. Operating expenses ($15,896,781) advanced by $749,022, to leave net earnings of $3,431,576, which were $206,943 lower than for October, 1936. Aggregate gross earnings from January 1 to October 31, 1937, were $165,403,656, an improvement of $12,169,066, and the net earnings for the ten months were $13,959,438, an increase of $4,115,458.

Southern Railway's New Sales League.—A new scheme for stimulating railwaymen to attract increased traffic to the Southern Railway was explained by Mr. E. J. Missenden, Traffic Manager, at a luncheon at Brighton on December 8. Mr. Missenden announced that it had been decided to launch a Southern Sales League. Trophies would be offered for competition in each division for the stations or sections obtaining the largest increase of traffic, while substantial cash prizes would be offered in each division for the best individual efforts in railway salesmanship. The objective of the league, he said, was to increase passenger and goods traffic revenue next year by about £250,000, and each station would be notified in due course of the total amount of revenue it was expected to earn during the coming year.

Great Southern Railways (Ireland) Increase in Rates and Charges.—The application for increases of 5 per cent. was heard on November 16, 17, and 18, and judgment has now been delivered by the Chairman of the Railway Tribunal. Judge O'Brien, who heard the case, states that the Court has come to the conclusion that an increase of 5 per cent. applied as far

as practicable to all the standard charges, and to all the exceptional charges of the company, will enable the company to obtain more revenue from every class of traffic than it will obtain if that increase is not made, and thus enable it to offset or partly offset a reduction of its net revenue, or, in other words, enable the company to avoid or minimise a retrogression from the objective of standard revenue. The report of the proceedings has not yet been received, but a summary of it may be available later. January 1, 1938, was fixed as the day on which the modification shall take effect.

Railway Exhibits at Lahore Exhibition.—Under the auspices of the Government of the Punjab, an All-India Arts and Industries Exhibition is being held in the Minto Park, Lahore, from December 6, 1937, to January 22, 1938. The North Western Railway has laid a special siding to the exhibition grounds, and is to exhibit *inter alia* the old 0-4-2 tender engine *Eagle*, built by Robert Stephenson & Co. Ltd. for one of the constituent lines of the present N.W.R. in 1869, and alongside it will also be exhibited one of the latest "XC" or largest I.S.R. Pacifics. In addition there will be a display of modern coaching stock, including a full-sized sectionalised first class coach. A model of the famous Attock bridge over the Indus, showing the method of reconstruction in 1929, will also be loaned from the Walton Training School.

Belgian Congo Loan.—A Reuters message from Brussels states that a Royal decree provides for the creation of 4 per cent. colonial debt not convertible before January 1, 1947, in the form of bearer bonds of the Belgian Congo Public Debt. The nominal amount of the issue is 1,100,000,000 Belgian francs (about £7,000,000), intended for exchange with Congo Railway bonds and the funding of Belgian Congo treasury bonds. A second Royal decree authorises the issue of a portion of the loan amounting to 865,502,400 francs (about £5,700,000), to be exchanged against bonded debt of the Congo Railway Company.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 48th Week			Totals to Date		
	1937	1936	Inc. or Dec.	1937	1936	Inc. or Dec.
	£	£	£	£	£	£
L.M.S.R. (6,867 mls.)						
Passenger-train traffic...	418,000	412,000	+ 6,000	24,854,000	23,899,000	+ 955,000
Merchandise, &c. ...	541,000	520,000	+ 21,000	23,914,000	23,154,000	+ 760,000
Coal and coke ...	321,000	300,000	+ 21,000	12,364,000	11,603,000	+ 761,000
Goods-train traffic ...	862,000	820,000	+ 42,000	36,278,000	34,757,000	+1,521,000
Total receipts	1,280,000	1,232,000	+ 48,000	61,132,000	58,656,000	+2,476,000
L.N.E.R. (6,315 mls.)						
Passenger-train traffic...	282,000	280,000	+ 2,000	16,301,000	15,600,000	+ 701,000
Merchandise, &c. ...	390,000	364,000	+ 26,000	16,485,000	15,881,000	+ 604,000
Coal and coke ...	287,000	263,000	+ 24,000	12,010,000	11,214,000	+ 796,000
Goods-train traffic ...	677,000	627,000	+ 50,000	28,495,000	27,095,000	+1,400,000
Total receipts	959,000	907,000	+ 52,000	44,796,000	42,695,000	+2,101,000
G.W.R. (3,739½ mls.)						
Passenger-train traffic...	175,000	175,000	—	10,430,000	10,162,000	+ 268,000
Merchandise, &c. ...	217,000	213,000	+ 4,000	9,710,000	9,301,000	+ 409,000
Coal and coke ...	129,000	120,000	+ 9,000	5,408,000	4,855,000	+ 553,000
Goods-train traffic ...	346,000	333,000	+ 13,000	15,118,000	14,156,000	+ 962,000
Total receipts	521,000	508,000	+ 13,000	25,548,000	24,318,000	+1,230,000
S.R. (2,147 mls.)						
Passenger-train traffic...	252,000	248,000	+ 4,000	15,550,000	14,817,000	+ 733,000
Merchandise, &c. ...	66,500	64,500	+ 2,000	3,020,500	3,055,000	− 34,500
Coal and coke ...	39,500	31,500	+ 8,000	1,452,500	1,474,000	− 21,500
Goods-train traffic ...	106,000	96,000	+ 10,000	4,473,000	4,529,000	− 56,000
Total receipts	358,000	344,000	+ 14,000	20,023,000	19,346,000	+ 677,000
Liverpool Overhead ... (6½ mls.)	1,319	1,241	+ 78	62,489	57,388	+ 5,101
Mersey (4½ mls.) ...	4,501	4,588	− 87	201,807	197,152	+ 4,655
London Passenger Transport Board ...	555,300	570,400	− 15,100	12,901,400	12,902,000	− 600
IRELAND						
†Belfast & C.D. pass. (80 mls.)	1,618	1,504	+ 114	122,987	124,101	− 1,114
,, ,, goods	544	587	− 43	23,247	26,183	− 2,936
,, ,, total	2,162	2,091	+ 71	146,234	150,284	− 4,050
Great Northern pass. (543 mls.)	8,100	8,300	− 200	531,750	517,150	+ 14,600
,, ,, goods	9,300	9,750	− 450	454,250	471,350	− 17,100
,, ,, total	17,400	18,050	− 650	986,000	988,500	− 2,500
Great Southern pass. (2,076 mls.)	28,345	28,983	− 638	1,750,781	1,730,010	+ 20,771
,, ,, goods	57,509	62,827	− 5,318	2,076,930	2,116,047	− 39,117
,, ,, total	85,854	91,810	− 5,956	3,827,711	3,846,057	− 18,346

* 23rd week (before pooling) † 49th week

British and Irish Railway Stocks and Shares

Stocks	Highest 1936	Lowest 1936	Prices Dec. 8, 1937	Prices Rise/Fall
G.W.R.				
Cons. Ord. ...	64¼	45½	62	+½
5% Con. Prefce. ...	126½	116¾	117½	+½
5% Red.Pref.(1950)	113	108½	110½	—
4% Deb.	119½	110½	109½	+½
4½% Deb.... ...	121	114	111	—
4½% Deb.... ...	129	121	117½	—
5% Deb.	141	134	128½	—
2½% Deb.... ...	79⅛	74	69½	—
5% Rt. Charge ...	136½	130	127½	—
5% Cons. Guar. ...	135¼	127¾	125½	+1
L.M.S.R.				
Ord.	35⅝	17	29¼	+¼
4% Prefce. (1923)	83	52½	70½	—
4% Prefce. ...	92¾	81	81½	+½
5% Red.Pref.(1955)	109¼	103¼	106	—
4% Deb.	111¾	105 9/16	105½	—
5% Red.Deb.(1952)	119⅝	115½	113½	—
4% Guar. ...	106¾	101⅝	100½	—
L.N.E.R.				
5% Pref. Ord. ...	14	9	8	−¼
Def. Ord.	7¼	4¾	4⅝	+⅛
4% First Prefce.	79¼	55¼	67½	—
4% Second Prefce.	31⅞	18¼	26	—
5% Red.Pref.(1955)	100½	77¾	97½	—
4% First Guar. ...	104½	98¾	95	—
4% Second Guar.	99	90	88½	—
3% Deb.	85¾	79	79½	+½
4% Deb.	109¾	104½	104	+1
5% Red.Deb.(1947)	116¼	110½	110½	—
4½% Sinking Fund Red. Deb.	111½	107½	108	—
SOUTHERN				
Pref. Ord.... ...	98¾	82½	87	+½
Def. Ord.	27⅝	20⅛	19	—
5% Pref.	120¾	118½	114½	—
5% Red.Pref.(1964)	119¾	115¼	113½	—
5% Guar. Prefce.	136	129½	125	+½
5% Red.Guar.Pref. (1957)	120	115¾	115	—
4% Deb.	117 5/16	109½	106½*	—
5% Deb.	140	134	125½*	—
4% Red. Deb. 1962–67	116½	110	105½*	—
BELFAST & C.D.				
Ord.	9	4½	4½	—
FORTH BRIDGE				
4% Deb.	107	105	102½	—
4% Guar. ...	107 5/16	104	102½	+1
G. NORTHERN (IRELAND)				
Ord.	19½	9¾	5	—
G. SOUTHERN (IRELAND)				
Ord.	63	41	27	—
Prefce.	65	46	35	—
Guar.	97¼	81	70½	—
Deb.	99¾	83¼	86	—
L.P.T.B.				
4½% "A" ...	127¾	121	117½*	+1½
5% "A" ...	138¼	133½	126½*	+1
4½% "T.F.A." ...	111½	108½	106*	−1
5% "B"	131¾	123¾	119½*	+1
"C"	112½	93	81	—
MERSEY				
Ord	40¾	23	24½	—
4% Perp. Deb. ...	103	98	97	—
3% Perp. Deb. ...	78	74⅝	75½	+1
3% Perp. Prefce.	68⅞	63¼	66½	—

* ex dividend

CONTRACTS AND TENDERS

£3,000,000 L.M.S.R. Rolling-Stock Programme

The L.M.S.R. is to spend over £3,000,000 on a 1938 renewal programme which provides for 110 new locomotives, 324 new locomotive boilers, 732 coaching vehicles, 9,715 freight vehicles, and 375 road-rail containers. The normal renewal programme of new engines comprises 15 heavy freight (2-8-0 type), 20 mixed-traffic (4-6-0 type), 30 goods engines (0-6-0 type), and 35 passenger tank engines (2-6-4 type). The tractive effort of these engines will be 20 per cent. greater than the locomotives which they will replace. In addition the L.M.S.R. is to build, as a supplement to the normal programme, ten new streamlined locomotives of the " Princess Coronation " class (4-6-2 type). These engines will be similar to the five streamlined locomotives built at Crewe works this year for the Coronation Scot high-speed service between London and Glasgow. All the new locomotives covered by this programme will be constructed in the L.M.S.R. works at Crewe and Derby. The coaching-stock programme for 1938 comprises 621 passenger-carrying vehicles, and 111 non-passenger-carrying (six kitchen cars, 75 parcels vans, and 30 horse-boxes). The 621 passenger-carrying vehicles will have an aggregate seating capacity of 38,728 seats, and will comprise 350 corridor, and 271 non-corridor, the latter being for suburban and short-distance local services. There will be 58 vestibule coaches, while some of the largest items in this part of the programme are 90 third class corridor brakes, 89 third-corridor coaches, and 73 corridor-composites. Included in the freight stock renewal programme of 9,715 vehicles are 5,700 open wagons, 1,500 mineral wagons (including 500 twenty-ton steel hopper wagons), 1,500 covered vans, 690 rail and timber trucks, 25 special wagons for the conveyance of containers, and 300 goods brake vans. A good proportion of the new freight vehicles will be fitted with the automatic vacuum brake to enable them to be run in fast goods trains.

L.N.E.R. Programme for 1938

Further details are now available of the L.N.E.R. programme for 1938, during which year it is announced that the company is proposing to build 125 locomotives at its works. The programme also includes the construction of 730 carriages (of which details were given in our issue of November 26); 10,240 wagons; 1,250 containers; and the renewal of 587½ miles of track and 70 bridges (*see* our issue of November 19). The construction of locomotives has been allocated between Doncaster and Darlington workshops, whilst in addition, for the first time since 1928, the L.N.E.R. works at Gorton (Manchester) are to build new engines; these shops have concentrated on repair work for the past ten years. At Doncaster 14 streamlined Pacific engines of the " A4 " or " Dominion " class, will be built, together with 20 passenger tank locomotives of the " V1 " 2-6-2 design. The Darlington works are concentrating on the construction of 39 mixed traffic engines of the " V2 " or " Green Arrow " class and 38 goods engines of a type also adaptable for working passenger trains. The locomotives to be built at Gorton are of a powerful type for shunting and local goods working, and will number 14.

Vereinigte Westdeutsche Waggonfabriken A.G., has received an order from the Egyptian State Railways Administration for 200 low-sided 10-ton wagons to be manufactured by Fuchs Waggonfabrik A.G.

Ransomes & Rapier Limited has received an order from the L.N.E.R. for a standard six-ton petrol-electric mobile crane for handling road-rail containers in replacement of a fixed hand crane, and similar to those already supplied to this company. The L.N.E.R. has also authorised mobile cranes for Newcastle and Middlesbrough.

John I. Thornycroft & Co. Ltd. has received a repeat order from the L.N.E.R. for a number of Sturdy class vehicles, making a total of 16 similar vehicles requisitioned during the past four months. The chassis, with bodywork, will weigh under 2½-tons in licensing order, so that the legal road speed will be 30 m.p.h.

John I. Thornycroft & Co. Ltd. has also received an order from the Caminhos de Ferro de Colonia de Mozambique for a number of Amazon class heavy-duty cross-country chassis. These chassis will have a mean wheelbase of 16 ft. 6 in., the twin driving axles incorporating the well-known Thornycroft patented suspension system. In order to give the maximum ground clearance, 11·25 in. low-pressure tyres are being fitted as standard. As regards the power unit, this is a six-cylinder Thornycroft oil engine, developing up to 100-b.h.p., and having a capacity of 7·88 litres.

D. Wickham & Co. Ltd. has received orders from the Argentine North Eastern Railway for two light petrol-driven permanent way gang trolleys, and from the Entre Rios Railways for one similar trolley.

The Chilean State Railways Administration has placed a contract worth $1,000,000 (approximately £200,000) with the Bethlehem Steel Corporation for steel rails. The Administration is also considering the purchase of six locomotives, states Reuters.

Samuel Osborn (India) Limited has received orders from the Indian Stores Department for 287 steel locomotive tyres and 12 straight axles.

Dean, Smith & Grace Limited has received an order for two 8½-in. centre high-speed double-geared self-acting sliding, surfacing and screwcutting lathes, from the Central Uruguay Railway.

W. & C. French Limited has received the contract from the London Passenger Transport Board for the rebuilding of Sloane Square station. Details will be found in our news section in this issue.

Locomotives for India

The Vulcan Foundry Co. Ltd. has received an order from the Rohilkund & Kumaon Railway Administration for three " P " class metre-gauge 4-6-0 passenger locomotives and tenders, to be supplied to the inspection of Messrs. Rendel, Palmer & Tritton. This constitutes an extension on the order for four similar engines placed by this administration with the same firm as recorded on this page of our issue of September 24.

William Jacks & Company has received an order from the Indian Stores Department for seven crank axles.

A. Herbert Limited has received orders for two No. 9 combination turret lathes, one type " C " motor-driven single-spindle drilling machine and one belt-driven patent sand mixing machine from the Central Uruguay Railway.

The South Indian Railway Administration has placed the following orders to the inspection of Messrs. Robert White & Partners :—

Nasmyth Wilson & Co. Ltd.; 18 cast steel locomotive piston heads.

P. & W. Maclellan Limited; Approximately 11 tons of steel bars.

Guest, Keen & Nettlefolds Limited; 6,600 fang bolts, nuts and washers.

Anderston Foundry Co. Ltd.; 7¼ tons of wrought iron gibs.

Monkbridge Iron & Steel Co. Ltd.; 24 locomotive tyres and 138 carriage and wagon tyres.

The Hydraulic Coupling & Engineering Co. Ltd. has received an order for 30 Vulcan-Sinclair hydraulic couplings for installation in the 12 twin-car diesel trains and six diesel railcars with Carels Ganz engines ordered by the Belgian National Railways, as detailed in our issue of November 26. These couplings are to be used in conjunction with SLM-Winterthur gearboxes.

The Chinese Government Purchasing Commission, on behalf of the Ministry of Railways, China, has placed orders for the following 43-kilo. per metre permanent way equipment :—

Lancashire Steel Corporation; 280 tons of rails.

Dorman Long & Co. Ltd.; 20 tons of fish-plates.

Guest, Keen & Nettlefolds Limited; Seven tons of spikes.

S. A. des Laminoirs et Boulonneries de Ruau has received orders for 200,000 mild steel dogspikes, 100,000 being for the Entre Rios Railways, and 100,000 for the Argentine North Eastern Railway.

Eleven firms, including British, Belgian, German, and Czechoslovak, have submitted tenders for the supply of four locomotives for the Egyptian State Railways. The lowest tender, £3,466, was put forward by the S.A. Anglo-Franco Belge. The lowest British tender, that submitted by W. G. Bagnall Limited, was £4,097, states Reuters.

PARLIAMENTARY NOTICES

IN PARLIAMENT.
Session 1937-38.

London and North Eastern Railway

NOTICE IS HEREBY GIVEN that application has been made to Parliament in the present Session by the London & North Eastern Railway Company for an Act under the above name or short title intituled "A Bill to empower the London & North Eastern Railway Company to widen certain of their railways; to construct other works in connection with their undertaking and to acquire lands; to confer further powers on the Company; and for other purposes."

A notice containing a concise summary of the purposes of the intended Act has been or will be published in *The Times* newspaper of the 3rd and 10th December, 1937.

On and after the 4th day of December, 1937, a printed copy of the Bill for the intended Act may be inspected and copies thereof obtained at a price not exceeding three shillings for each copy at the undermentioned offices and at the stationmaster's office at the following railway stations of the Company, viz., Chelmsford, Derby, Leicester (Central), Nottingham (Victoria), Peterborough (North), Rugby (Central) and Leeds (New).

AND NOTICE IS HEREBY ALSO GIVEN that on or before the 20th day of November, 1937, plans and sections relating to the said intended works and plans of all lands which may be taken or used compulsorily with a book of reference to such plans were deposited for public inspection as follows (that is to say):—

As regards works and lands in the County of Essex with the Clerk of the County Council of that county at his office at Chelmsford; as regards works and lands in the County of Leicester with the Clerk of the County Council of that county at his office at Leicester; as regards works and lands in the County of Nottingham with the Clerk of the County Council of that county at his office at Nottingham; as regards works and lands in the City and County Borough of Sheffield with the Town Clerk of that city at his office at Sheffield; as regards lands in the County of Derby with the Clerk of the County Council of that county at his office at Derby; as regards lands in the County of Northampton with the Clerk of the County Council of that county at his office at Northampton; as regards lands in the County of Warwick with the Clerk of the County Council of that county at his office at Warwick; as regards lands in the West Riding of the County of York with the Clerk of the County Council of that county at his office at Wakefield, and as regards lands in the County Borough of West Ham with the Town Clerk of that borough at his office at West Ham.

And that copies of so much of the said plans, sections and book of reference as relates to each of the several areas hereinafter mentioned in or through which the said intended works are proposed to be made or lands are situate were on or before the said 20th day of November deposited for public inspection (that is to say):—

As relates to any non-county borough with the Town Clerk of such borough at his office; as relates to any urban district (not being a borough) or to any rural district with the Clerk of the district council of such district at his office; as relates to any parish having a parish council with the Clerk of the parish council of such parish at his office, or if he have no office at his residence; as relates to the parishes of Swithland Shawell and Ashby Magna with the Chairman of the parish meeting of each such parish at his residence, and as relates to the parish of Charwelton with the Stationmaster of the Company's Charwelton Station at his office.

Dated this 6th day of December, 1937.

I. BUCHANAN PRITCHARD,
King's Cross Station,
N.1.
Chief Legal Adviser.

W. R. MOLE,
4, Cowley Street,
Westminster, S.W.1.
Assistant Solicitor.

SHERWOOD & Co.,
Clarence House,
4, Central Buildings,
Westminster, S.W.1.
Parliamentary Agents.

IN PARLIAMENT.
Session 1937-38.

Southern Railway

NOTICE IS HEREBY GIVEN that application has been made to Parliament in the present Session by the Southern Railway Company for an Act under the above name or short title intituled "A Bill to empower the Southern Railway Company to construct works and to acquire lands; to extend the time for the compulsory purchase of certain lands; to make provision with reference to the rates, rents, tolls and charges which may be levied at the Southampton Docks of the Company; to confer further powers upon the Company; and for other purposes."

A Notice containing a concise summary of the purposes of the intended Act has been or will be published in *The Times* newspaper of the 2nd and 9th December, 1937.

On and after the 4th day of December, 1937, a copy of the Bill may be inspected and copies thereof obtained at a price not exceeding four shillings for each copy at the undermentioned offices and at the stationmaster's office at the following railway stations of the Company, viz., Twickenham, Maidstone West, Lewes, Guildford, Reading, Exeter and Winchester.

AND NOTICE IS HEREBY ALSO GIVEN that on or before the 20th day of November, 1937, plans and sections relating to the said intended works and plans of all lands which may be taken or used compulsorily with a book of reference to such plans were deposited for public inspection as follows (that is to say):—

As regards works and lands in the County of Middlesex with the Clerk of the County Council of that county at his office at the Guildhall, Westminster; as regards works and lands in the County of Kent with the Clerk of the County Council of that county at his office at Maidstone; as regards works and lands in the County of East Sussex with the Clerk of the County Council of that county at his office at Lewes; as regards works and lands in the County of West Sussex with the Clerk of the County Council of that county at his office at Chichester; as regards lands in the County of Surrey with the Clerk of the County Council of that county at his office at Kingston-upon-Thames; as regards lands in the County of Berks with the Clerk of the County Council of that county at his office at Reading and as regards lands in the County of Devon with the Clerk of the County Council of that county at his office at Exeter.

And that copies of so much of the said plans, sections and book of reference as relates to each of the several areas hereinafter mentioned in or through which the said intended works are proposed to be made or lands are situate were on or before the said 20th day of November deposited for public inspection as follows (that is to say):—

As relates to the City of Rochester with the Town Clerk of that City at his office; as relates to any borough with the Town Clerk of that borough at his office; as relates to any urban district (not being a borough) or to any rural district with the Clerk of the district council of such district at his office, and as relates to any parish comprised in a rural district with the Clerk of the parish council of such parish at his office, or if he has no office at his residence.

Dated this 6th day of December, 1937.

WM. BISHOP,
Waterloo Station,
London, S.E.1.
Solicitor.

SHERWOOD & Co.,
Clarence House,
4, Central Buildings,
Westminster, S.W.1.
Parliamentary Agents.

AMBULANCE PRESENTATION AT BRISTOL.—The Hon. Windham Baldwin, a Director of the Great Western Railway, made the presentations to members of the Bristol ambulance class, the largest station class on the system, at the annual dinner and smoking concert, held at the Cadena Café on November 25. Mr. R. G. Pole, Divisional Superintendent, presided over the function, and was supported by Mr. R. G. J. Barefoot, District Goods Manager; Mr. H. A. Alexander, Divisional Engineer; Mr. W. N. Pellow, Divisional Locomotive Superintendent; and Mr. A. V. Brown, Assistant Divisional Superintendent. In addition to upwards of 200 class examination awards, Mr. Baldwin presented a number of the company's gold efficiency medals and bars for periods ranging from 15 to 35 years' ambulance service. Congratulating the recipients on their success, he mentioned that upwards of 9,000 members of the staff, or 10 per cent., were trained ambulance men. Reports of the year's work were submitted by the class secretaries, Mr. E. E. Jakeway (men's class) and Miss W. U. Smith (women's class). A concert programme was provided.

OFFICIAL NOTICES

Government of India

ASSISTANT ENGINEERS (INSPECTION) WAGONS.

APPLICATIONS are invited for two appointments as Assistant Engineer (Inspection) in the Indian Stores Department. Candidates must be British subjects or subjects of an Indian State, aged between 24 and 35 years, and should have had a sound general education. They should have served an apprenticeship or pupilage of not less than three years with a firm of steel railway wagon builders or in railway workshops, followed by at least two years' experience in a responsible post connected with the fabrication of steel railway wagons or in railway workshops. During apprenticeship or subsequently, at least six months should have been spent in a drawing office. Full practical experience essential. Agreement for five years in first instance. Pay scale Rs. 350 rising by annual increments of Rs. 25 to Rs. 550 a calendar month and thence by increments of Rs. 30 to Rs. 700 a calendar month. Initial pay in scale according to qualifications and experience. In addition, Overseas Pay of Rs. 150 a calendar month will be granted to officers of non-Asiatic domicile. Free passage to India. House rent allowance. Provident Fund.

Further particulars and forms of application may be obtained, on application by postcard, from the High Commissioner for India, General Department, India House, Aldwych, London, W.C.2. Last date for receipt of applications 18th December, 1937.

THE INSTITUTE OF TRANSPORT EXAMINATIONS, 1938.

THE Graduateship and Associate Membership examinations will be held in London and at other centres on Thursday, Friday and Saturday, April 28th, 29th and 30th, 1938.

Particulars of the objects of the Institute and copies of the Regulations and Syllabuses for the examinations may be obtained from the undersigned as well as previous question papers (price 1s. per set, post free), and copies of a revised and enlarged edition of a booklet, "The Institute of Transport Examinations; notes for the guidance of candidates unable to attend preparatory courses" (price 2s. 6d. post free).

A. WINTER GRAY,
Secretary.

15, Savoy Street,
London, W.C.2.

South Indian Railway Company Limited

THE Directors are prepared to receive Tenders for the supply of:—

STEEL TYRES.

Specifications and Forms of Tender will be available at the Company's Offices, 91, Petty France, Westminster, S.W.1.

Tenders, addressed to the Chairman and Directors of the South Indian Railway Company Limited, marked "Tender for Steel Tyres," with the name of the firm tendering, must be left with the undersigned not later than 12 Noon on Friday, the 31st December, 1937.

The Directors do not bind themselves to accept the lowest or any Tender.

A charge, which will not be returned, will be made of 10s. for each copy of the Specification.

Copies of the drawings may be obtained at the Offices of the Company's Consulting Engineers, Messrs. Robert White & Partners, 3, Victoria Street, Westminster, S.W.1.

E. A. S. BELL,
Managing Director.

91, Petty France,
Westminster, S.W.1.
8th December, 1937.

THE MADRAS & SOUTHERN MAHRATTA RAILWAY COMPANY LIMITED invite Tenders for:

(*a*) 486½ cwts. COPPER RODS, 6¾ cwts. COPPER TUBES and 182¼ cwts. COPPER SHEETS.
(*b*) 333¼ cwts. EXTRUDED BRASS RODS.
(*c*) 1,159 tons (approx.) STEEL MATERIAL: (Comprising—M.S. Rounds, Squares, Flats, Angles, &c., approx. 743 tons, and M.S. Plates and Sheets, approx. 416 tons.)

Specifications and Forms of Tender can be obtained at the Company's Offices, 123, Victoria Street, Westminster, London, S.W.1.

Fee ONE GUINEA each, *which will not be returned*.

Tenders for (*a*) Copper Rods, Tubes and Sheets and (*b*) Extruded Brass Rods must be submitted not later than 4 o'clock p.m. on FRIDAY, 31st DECEMBER, 1937, and Tenders for (*c*) Steel Material not later than 2 o'clock p.m. on WEDNESDAY, 5th JANUARY, 1938.

The Directors do not bind themselves to accept the lowest or any Tender and reserve to themselves the right of reducing or dividing the orders.

By Order of the Board,
G. W. V. DE RHE PHILIPE,
Secretary.

THE Crown Agents for the Colonies require in their Drawing Office a Junior Engineering Assistant with experience in Railway Permanent Way. The commencing salary will depend upon the candidate's age, experience, &c., and will rise by annual increments to a maximum in the grade of £337 a year. Applicants should state their age and forward full particulars of education, technical qualifications and experience to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, Westminster, S.W.1, quoting the reference O/Office 154.

Crown Agents for the Colonies

COLONIAL GOVERNMENT APPOINTMENTS.

APPLICATIONS from qualified candidates are invited for the following post:—

ADMINISTRATIVE ASSISTANT, GRADE II, required for the Nigerian Government Railway for two tours of 12-24 months each, with possible permanency. Salary £400—£400—£450—£25—£600 a year. Free passages and quarters and liberal leave on full salary. Candidates, aged 25-35, must have matriculated or have secured exemption from matriculation; be familiar with statistical and general secretarial work; be thoroughly competent shorthand typists; and be able to take charge of all routine work and to assume responsibility for the general supervision of correspondence and filing. Preference will be given to candidates who have had experience of the foregoing in the service of a British Railway.

Apply at once by letter, stating age and full particulars of qualifications and experience, including present speeds in shorthand and typing, to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, Westminster, London, S.W.1, quoting M/5615.

Universal Directory of Railway Officials and Railway Year Book

43rd Annual Edition, 1937-38

This unique publication gives the names of all the principal railway officers throughout the world, together with essential particulars of the systems with which they are connected. Much general and statistical information about railways is also concisely presented.

Price 20/- net.

THE DIRECTORY PUBLISHING CO. LTD.
33, Tothill Street, Westminster, S.W.1.

RAILWAY AND OTHER REPORTS

Metropolitan Railway Country Estates Limited.—The board has decided to pay a dividend of 5 per cent. for the year ended October 31, to transfer £15,000 to general reserve, and to carry £28,646 forward. For the previous year the dividend and reserve allocation were the same and £32,331 was carried forward.

Bengal & North Western Railway.—The board has recommended a final dividend for the year ended September 30, 1937, of 7 per cent., together with a bonus of 3 per cent., on the ordinary stock, making with the *ad interim* dividend and bonus paid in July, 1937, a total of 18 per cent. per annum. The dividend and bonus will be payable, less income tax at 2s. 9d. in the £, on January 31, 1938.

Rohilkund & Kumaon Railway.—A final dividend for the year ended September 30, 1937, of 6 per cent., together with a bonus of 5 per cent. on the ordinary stock, is recommended, making with the *ad interim* dividend and bonus of 7 per cent. paid in July, 1937, a total payment of 18 per cent. per annum. The dividend and bonus now announced will be payable, less income tax at 2s. 8d. in the £, on January 24, 1938.

Canadian National Railways.—The estimated earnings of the Wellington, Grey & Bruce Railway Company for the half-year ending December 31, 1937, applicable to meet interest on the 7 per cent. bonds, will admit of the payment of £4 5s. 3d. per £100 bond, and this payment will be applied as follows: £2 17s. 1d. in final discharge of coupon No. 111 due January 1, 1926; £1 8s. 2d. on account of coupon No. 112 due July 1, 1926, and will be made on and after January 1 next, at the offices of the Canadian National Railway Company, 42/5, New Broad Street, E.C.2. Coupons must be left three clear days for examination.

State of Bahia South Western Railway.—Gross receipts for the year to April 30 amounted to £34,875, comparing with £33,449 for the previous year. Working expenses were £27,727, against £26,160, and net receipts declined from £7,289 to £7,148. The cocoa crop and cocoa exports from the Port of Ilheos were smaller than in the previous year, and the proportion carried by the railway was also less then in 1935-36. Net revenue is again insufficient to meet the full service of the 8 per cent. prior lien debenture stock for the year. The 3 per cent. balance of the half-year's interest due on May 1, 1936, and 3 per cent. on account of the half-year's interest due on November 1, 1936, have been paid.

Greenwood & Batley Limited.—An interim dividend is announced of 3 per cent. on the ordinary shares, payable on December 29. No interim dividend was paid a year ago.

Steel Barrel Scammells & Associated Engineers Limited.—An interim dividend is announced of 6 per cent. on the ordinary shares, payable on January 8. This compares with 5 per cent. a year ago.

Central Wagon Co. Ltd.—The directors are recommending a final dividend of 5 per cent., plus a bonus of 2 per cent., both less tax, for the year ended September 30 last. This makes, with the interim of 3 per cent., a total distribution of 10 per cent. for the year on the £500,000 capital.

Railway Share Market

Conditions in the stock and share markets have been inactive, and following news of the higher unemployment figures prices generally moved against holders. Subsequently a better tendency appeared to be developing. Stocks of the Home railways were firmer in sympathy, although the traffic figures for the past week were below anticipations. The market is, however, fairly confident the receipts would have been at a higher level had weather conditions in many districts been more favourable. A factor which induced attention to the junior stocks was news as to the probable dates of the dividend announcements. That of the Southern is expected on February 7, while those of the Great Western and L.M.S.R. will probably appear on February 11, to be followed by the L.N.E.R. statement on the 18th of that month.

L.N.E.R. second preference at 26 has failed to benefit from satisfaction with the £52,000 traffic gain—the largest increase shown by the individual figures of the main line railways for the past week. Rather more attention was given to the 4 per cent. first preference at around 67. There are still considerable variations in current market estimates of the dividend on the second preference. L.M.S.R. 4 per cent. preference and 1923 preference were both reported to be in somewhat better request on the view that, having regard to the yields offered, there is probably scope for moderate appreciation in prices when activity returns to markets. The ordinary stock has not kept best prices but was steadier at 29¼ on Wednesday, although a larger increase than £48,000 had been expected in the traffic return. The rise in the Great Western receipts for the past week was only £13,000, but in this case the ordinary stock at 62 was inclined to improve, sentiment being influenced by the fact that the market is continuing to estimate for earnings of around 4 per cent. on the stock for the year. Southern preferred attracted attention and is fractionally higher on balance at 86¾, although the deferred remained rather dull at 19. The market regarded the past week's £14,000 rise in traffics as satisfactory. Elsewhere London Transport "C" continued steady around 81.

Argentine railway stocks were dull, having again been affected by the very small amount of business passing. It is generally felt that values have been reduced to unduly low levels and that, in particular, the ordinary and preference stocks of B.A. Gt. Southern and Central Argentine may respond readily when market conditions become reasonably active. In other directions there was profit-taking in Nitrate Rails and Antofagasta, while San Paulo remained out of favour. Canadian Pacific fluctuated around 8½. American rails have attracted some support.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1936-37	Week Ending	Traffics for Week: Total this year	Traffics for Week: Inc. or Dec. compared with 1936	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1936	Prices: Lowest 1936	Prices: Dec. 8, 1937	Yield † (See Notes)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	5.12.37	19,360	+ 2,980	49	818,540	684,300	+ 134,240	Ord. Stk.	25	15¼	13	Nil
	Argentine North Eastern	758	4.12.37	9,380	+ 80	23	223,340	215,984	+ 7,356	,,	12	2	6	Nil
	Argentine Transandine	—	—	—	—	—	—	—	—	A. Deb.	54	45	85	4 11/16
	Bolivar	174	Nov., 1937	2,600	— 2,400	48	55,650	68,600	— 12,950	6 p.c. Deb.	9	5	8½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	16	11½	11½	4 5/16
	Buenos Ayres & Pacific	2,806	4.12.37	79,591	— 1,291	23	1,799,319	1,737,929	+ 61,390	Ord. Stk.	17½	6	7	Nil
	Buenos Ayres Central	190	13.11.37	$100,300	— $54,200	20	$2,774,800	$2,775,300	— $500	Mt. Deb.	31½	11	22½	Nil
	Buenos Ayres Gt. Southern	5,084	4.12.37	130,955	+ 7,014	23	2,897,134	2,587,196	+ 219,938	Ord. Stk.	31¾	13¾	17½	Nil
	Buenos Ayres Western	1,930	4.12.37	41,687	— 10,078	23	1,041,626	948,055	+ 93,571	,,	29¾	11	14	Nil
	Central Argentine	3,700	4.12.37	115,779	— 23,530	23	2,898,015	3,160,283	— 262,268	,,	32 9/32	8¾	14	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	21	4½	7	Nil
	Cent. Uruguay of M. Video	980	27.11.37	19,356	— 48	22	353,451	353,894	— 443	Ord. Stk.	7¾	3	3	Nil
	Cordoba Central	1,218	4.12.37	30,580	— 3,830	23	724,900	743,190	— 18,290	Ord. Inc.	5	1	2	Nil
	Costa Rica	188	Sept., 1937	29,141	+ 14,946	13	78,466	52,763	+ 25,683	Stk.	36½	32	31½	6⅜
	Dorada	70	Nov., 1937	15,800	+ 1,000	48	170,100	156,500	+ 13,600	1 Mt. Db.	107	101½	107½	5 9/16
	Entre Rios	810	4.12.37	13,573	— 844	23	307,112	293,095	+ 14,017	Ord. Stk.	17	6	7½	Nil
	Great Western of Brazil	1,092	4.12.37	13,000	+ 1,400	49	391,000	391,900	— 900	Ord. Sh.	½	5/16	5/8	Nil
	International of Cl. Amer.	794	Oct., 1937	$443,577	+ $149,452	44	$4,870,123	$4,223,770	+ $646,353	—	—	—	—	—
	Interoceanic of Mexico	—	—	—	—	—	—	—	—	1st Pref.	½	-/6	½	Nil
	La Guaira & Caracas	22¾	Nov., 1937	4,865	+ 240	48	56,685	50,475	+ 6,210	Stk.	9	3	8½	Nil
	Leopoldina	1,918	4.12.37	21,201	— 3,557	49	1,129,704	963,154	+ 166,550	Ord. Stk.	10½	3½	3½	Nil
	Mexican	483	30.11.37	$440,200	+ $79,900	22	$6,414,100	$5,811,300	+ $602,800	,,	1¼	¼	½	Nil
	Midland of Uruguay	319	Oct., 1937	8,915	+ 76	18	32,602	32,299	+ 303	,,	1½	1/8	½	Nil
	Nitrate	384	30.11.37	3,851	+ 2,212	48	139,513	109,544	+ 29,969	Ord. Sh.	63/6	41/9	21¼	Nil
	Paraguay Central	274	4.12.37	$3,409,000	+ $444,000	23	$73,911,000	$57,536,000	+ $16,375,000	Pr. Li. Stk.	85	71	80½	7 7/16
	Peruvian Corporation	1,059	Nov., 1937	79,177	+ 8,955	22	427,128	409,273	+ 17,855	Pref.	15	9	5	Nil
	Salvador	100	27.11.37	¢13,401	— ¢4,799	22	¢271,595	¢252,308	+ ¢19,287	Pr. Li. Db.	18	16	22½	Nil
	San Paulo	153½	28.11.37	31,387	— 2,253	48	1,558,168	1,410,858	+ 147,310	Ord. Stk.	86	46½	57½	8 11/16
	Taltal	160	Oct., 1937	2,815	— 850	18	12,885	12,420	+ 465	Ord. Sh.	115/32	14/-	5/4	13 5/16
	United of Havana	1,353	27.11.37	14,273	— 222	22	361,125	333,876	+ 27,249	Ord. Stk.	3¼	1	2	Nil
	Uruguay Northern	73	Oct., 1937	979	— 192	18	3,384	3,771	— 387	Deb. Stk.	5	3	3½	Nil
Canada	Canadian National	23,767	30.11.37	1,018,527	+ 91,913	48	36,435,436	33,877,253	+ 2,558,183	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	76	51	64 1/8 §	6 5/16
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	104 5/8	99¾	99 1/8 §	4
	Canadian Pacific	17,228	30.11.37	793,400	+ 82,600	48	26,564,800	25,262,000	+ 1,302,800	Ord. Stk.	16¾	10 15/16	8½	Nil
In Inf	Assam Bengal	1,329	10.11.37	43,267	— 659	30	827,867	781,774	+ 46,093	Ord. Stk.	87¾	82¼	79½	3¼
	Barsi Light	202	10.11.37	3,322	+ 960	30	76,125	68,295	+ 7,830	Ord. Sh.	77½	65½	53	9 7/16
	Bengal & North Western	2,107	20.11.37	85,246	+ 14,377	8	361,893	362,321	— 428	Ord. Stk.	319	292 5/8	308	5 5/16
	Bengal Dooars & Extension	161	10.11.37	4,639	+ 186	30	90,747	82,102	+ 8,645	,,	127½	118	86¼	7
	Bengal-Nagpur	3,268	20.11.37	184,425	+ 43,139	32	4,349,048	3,828,820	+ 520,228	,,	104	100¼	90 1/8 §	4 1/16
	Bombay, Baroda & Cl. India	3,072	30.11.37	247,500	— 15,975	34	5,763,900	5,408,325	+ 355,575	,,	114	110½	111 1/8 §	5 1/8
	Madras & Southern Mahratta	3,229	10.11.37	128,325	— 2,531	30	3,315,735	3,267,066	+ 48,669	,,	116½	108½	106 1/8 §	8
	Rohilkund & Kumaon	572	20.11.37	12,091	+ 1,087	8	57,348	61,167	— 3,819	,,	311	286	310	5 5/16
	South Indian	2,531½	10.11.37	98,664	— 2,868	30	2,574,073	2,478,580	+ 95,493	,,	107½	102 5/16	102½	5 5/8
Various	Beira-Umtali	204	Sept., 1937	98,053	+ 13,994	52	975,721	803,277	+ 172,444	—	—	—	—	—
	Egyptian Delta	620	20.11.37	8,211	— 1,463	32	168,065	158,078	+ 9,987	Prf. Sh.	21¼	15⅞	11¼	Nil
	Great Southern of Spain	—	—	—	—	—	—	—	—	Inc. Deb.	11½	1⅛	3½	Nil
	Kenya & Uganda	1,625	Oct., 1937	189,128	+ 6,241	44	2,303,239	2,131,020	+ 172,219	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	50½	37	45½	8⅝
	Midland of W. Australia	277	Oct., 1937	16,749	— 471	18	54,875	54,054	+ 821	Inc. Deb.	97	93½	95	4 5/16
	Nigerian	1,900	23.10.37	37,044	— 33,852	30	1,382,672	940,239	+ 442,433	—	—	—	—	—
	Rhodesia	2,451	Sept., 1937	432,312	+ 96,504	52	4,635,398	3,543,364	+ 1,092,034	—	—	—	—	—
	South Africa	13,263	13.11.37	658,654	+ 25,830	33	20,965,145	19,689,621	+ 1,275,524	—	—	—	—	—
	Victoria	4,774	June, 1937	793,223	+ 89,530	52	10,135,291	9,689,925	+ 445,366	—	—	—	—	—
	Zafra & Huelva	112	Sept., 1937	15,307	+ 8,641	39	117,046	65,948	+ 51,098	—	—	—	—	—

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16.

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. Salvador and Paraguay Central receipts are in currency.

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being overestimated. The statements are based on the current rates of exchange and not on the par value.

Electric Railway Traction

The Benefits of Electric Traction

IT is quite refreshing to hear a responsible British railway officer going almost the whole hog for suburban railway electrification, especially a traffic officer, for while an electrical engineer is expected to favour all kinds of conversion schemes, a traffic officer is supposed to consider only facts. And the facts, as Mr. Barrington-Ward put them in his paper on Modern Developments in Railway Operating Practice, read before the Institute of Transport on November 8, are that undoubtedly there would be advantages in electrifying all suburban services around London and other large cities, and that wherever electric working had been adopted the results had proved satisfactory and to the advantage of both the railway company and its users. The peak capacity of existing railways can be attained only by electrification in conjunction with colour-light signalling, and as an instance of this one might mention the 190 up and 190 down trains a day over two tracks between Haywards Heath and Keymer junction and the 170 up and 170 down trains a day between Three Bridges and Copyhold junction on the Southern Railway, or the 280 trains a day crossing each other's paths at Willingdon junction, near Eastbourne. As far as short-distance intensive suburban services are concerned, one of the greatest advantages of electrification is the ability to use multiple-unit trains, which not only have great power concentrated down their length, but well-nigh double the capacity of the termini by halving the number of movements generally necessary with locomotive traction. This advantage can hardly be stressed too much in view of the limitations of most big terminal stations in Britain, and the impossibility of enlarging them except at enormous expense and with not a little trouble. These advantages, allied to the very great acceleration and retardation capacity, and the lesser platform space occupied for a given seating capacity, make electric traction indispensable to the really efficient operation of an intensive suburban service, and thoroughly justify Mr. Barrington-Ward's remarks as to the desirability of electrifying all the suburban services.

Sussex Electrification Figures

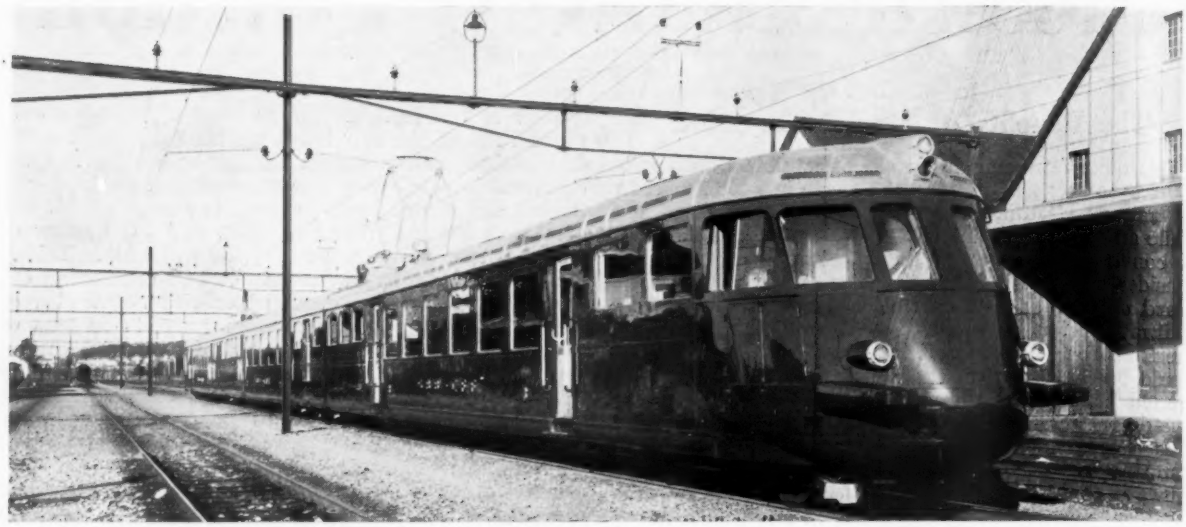
THE benefits of electrification on the Southern Railway have made themselves so patent to travellers, traders and local inhabitants that it is not uncommon for deputations from non-electrified areas to press upon the company their claims for an electric service. Nevertheless, there are always some who will decry anything which is successful without their assistance, and in reply to one of these, Mr. G. S. Szlumper, writing in the *Railway Stockholder*, gives some interesting figures as to the traffic conditions in Sussex before and after electrification. Dealing first with the services between Brighton and Hastings, Mr. Szlumper stated that the present 32 through and 19 changing services each way per day represent an increase of 121·7 per cent. over the old steam service, and the travelling time has been cut down from 84 and 87 min. to 78 and 72 min. The number of passengers conveyed between the two towns increased by about 3,000 during 1936 compared with the last steam year. Over the Worthing—Brighton section, electrified in 1933, the traffic had increased by 59 per cent. to a total of 5,750,962 passengers between 1932 and 1936, and the number of season tickets increased from 16,755 to 23,845. Taking the Southern Railway as a whole, the electrification extensions in the London area had enabled the number of trains a year to be increased from 1,700,638 in 1924 to 2,483,701 in 1936 and the number of passengers carried from 299,653,124 to 360,262,110. It would be impossible to run so many trains under steam traction without extensive widening of lines in the London area and elsewhere, the cost of which would be prohibitive, so that viewed in its proper perspective electrification is a comparatively inexpensive method of increasing the track capacity, and, therefore, the earning power of the railway; in this respect it should be borne in mind that over 70 per cent. of the company's revenue is derived from passenger traffic and that a regular and frequent service of trains is essential to meet the ever increasing intensity of road competition. Further electrification traffic figures relating to the Sussex area and the south coast generally, as given by Mr. Szlumper, were given in the last issue of this Supplement.

Electrical Production and Demand

THERE must have been more than a few guests at the Beama annual dinner on November 4 who listened with some amazement to the speech made by the Home Secretary, Sir Samuel Hoare, when proposing the toast of "The Electrical Industry," for his remarks ended with an exhortation to them to double their output and halve their prices. By the personnel of an industry which, by process improvements, has reduced the price of its commodities to probably a greater degree than any other industry in the last two decades, this statement could hardly be viewed with great enthusiasm, even if eventually that feat were to prove a panacea. Production presents no difficulty; to double output would be possible in a comparatively short time on purely physical grounds; but that very accomplishment which the industry and skill of electrical engineers has made readily possible is prevented by only one factor, which can be put simply as lack of effective demand for the output. There is, however, a potential demand which is not made effective because it is not backed up by that which is necessary to meet the price. This factor is the constriction that throttles down not only the electrical engineering industry, but all modern industry, and is due to an obvious chronic disparity between purchasing power and prices. The theory of this flaw in the money system has been expounded, but, without going into its technicalities, its truth may be observed by a glance at the conditions of what has come to be called "poverty in the midst of plenty." Such conditions can have only one explanation.

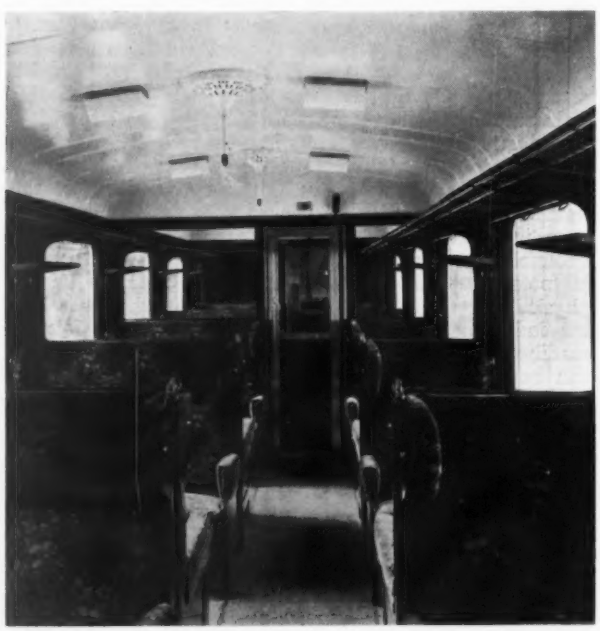
HIGH-SPEED ELECTRIC TRAINS IN SWITZERLAND

Eight-motor triple-car design with acceleration of 1·7 to 2·0 ft. per sec. per sec. to reach 90 m.p.h. in two minutes from start



2,320 h.p. electric train for solo operation, Swiss Federal Railways

THE satisfactory experience gained with the single-unit Red Arrow electric motor-coaches (see *Electric Railway Traction Supplement* for July 27, 1934), led the Swiss Federal Railways to order early in 1936 two triple-car non-articulated streamlined electric trains for operation at high speeds over the main lines in the central and south-western portion of the country. These trains are now being used for excursions and special or supplementary services, which is the usual Swiss method of running such vehicles in and obtaining all desirable data before they take over regular passenger workings.

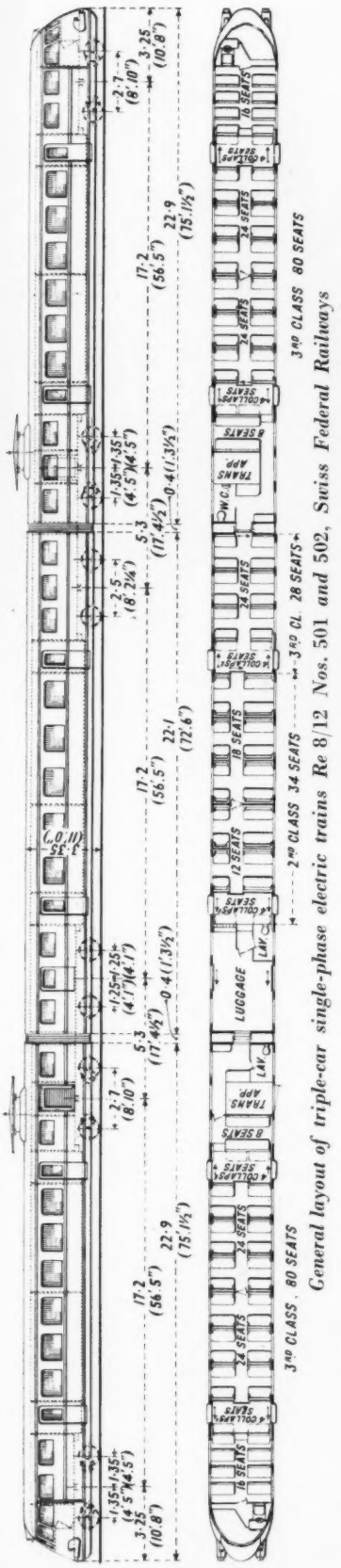


Interior of second class saloon

A motor is fitted to each axle of the two outer cars and the centre vehicle is non-motored. Current is collected by two pantographs, one above the inner end of each car, and just below each collector is a small compartment carrying a transformer and other auxiliary electrical equipment. The outer and centre cars carry third class passengers to a total of 192 including the use of the tip-up seats in the entrance vestibules, and the centre car also has seats for 30 second class passengers and a large baggage compartment. The tare weight of a train is 117 *tonnes*, of which 40 *tonnes* represents the weight of the electrical equipment; with a full load of passengers and luggage the weight is about 140 *tonnes*. The overhead line current is the Swiss standard 15 kV. $16\frac{2}{3}$ cycles single-phase and the aggregate one-hour rating of the eight motors is 2,320 h.p. at 71 m.p.h.; the top permissible speed is 93 m.p.h. The mechanical portions of the trains were built by the Swiss Locomotive Company, and the electrical equipment and individual axle drives were shared between Brown Boveri, Oerlikon, and Secheron.

To keep the weight down as far as possible without reducing the strength or rigidity, light metals have been used for various fixtures and fittings, and also for the roof, the body panels, and the walls of the electrical equipment compartments. The body framing and underframing are fabricated by electric welding as an integral structure of non-corrodible steel. The space between the double roof plates houses the resistances for the electric braking apparatus, and these are cooled by the air which is drawn in to the roof duct by the natural draught of the train motion. The two end motor-coaches are identical and the saloons are connected to those of the centre car by vestibules having casings the full width of the body.

In the third class saloons the seats—two on each side of the central gangway—are covered in leather, and the second class seats are covered in moquette. The second



General layout of triple-car single-phase electric trains Re 8/12 Nos. 501 and 502, Swiss Federal Railways

class seating is slightly different in the two trains, one having three seats across and the other four. The floors of the third class saloons are covered with linoleum and that of the second class saloon in hair carpet. Imitation leather covers the inner panel plates of the third class cars and polished walnut those of the second class saloon. All the windows in the passenger portion can be opened, but the four front windows of each driving cabin are fixed, and have double glass and a heating arrangement to prevent the formation of frost or ice during winter.

Welded box frame construction has been adopted for the bogies, which have 35½-in. wheels with axles carried on roller bearings. Each box is supported by two helical springs; the floating bolster is supported on long laminated springs carried between the side pieces of each box frame structure, and it supports its

Driving cabin from end of passenger saloon

share of the body load only through the side bearers, the pivot dealing with the rotating movements and transmitting the tractive and braking forces. The riding of the train is improved by the provision of hydraulic shock absorbers on the bogies. Westinghouse brakes are incorporated and can apply a braking force up to 115 per cent. of the tare weight through two brake blocks with removable shoes to each wheel. Each bogie carries its own brake cylinder, auxiliary reservoir and triple valve. Electric braking is used for normal stops and for holding the speed steady when descending long grades, the motors being excited by current from a battery and acting as auto-excited generators, the braking energy being absorbed by the resistances in the roof. As the electric braking does not function down to a dead stand, the air brakes on the carrying wheels are applied over the lower speed range in normal stops, the normal maximum air pressure of 100 lb. per sq. in. being automatically reduced to 42 lb. for such applications. The air for the brake and sanding apparatus is supplied by two SLM two-stage compressors mounted beneath the driving cabins, and each has a capacity of 1,060 cu. ft. of air an hour at a pressure of 100 lb. per sq. in. The driving agency is a motor with a short-time rating of 7·7 h.p. at 2,850 r.p.m. Two brake reservoirs, each with a capacity of 6·7 cu. ft. are mounted beneath each vehicle, and those on the centre vehicle are fed through a reducing valve at a pressure of 70 lb. per sq. in. and the air in them serves to operate some of the auxiliary electrical equipment as well as the carrying wheel brakes. Each bogie of the centre vehicle is made to carry, through a compressed air operated adjuster, some of the weight of the adjacent motor-coach, which otherwise would be unduly heavy.

Electrical Equipment

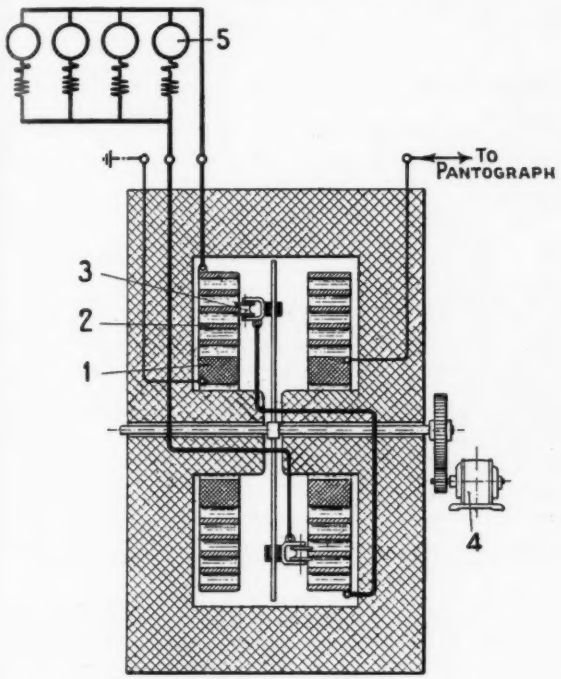
The first of the two trains is equipped with traction motors and individual axle drive of the Oerlikon type, and the second train with motors and drive made by Secheron; in each train the transformer and control system are of Brown Boveri make. Each motor has a one-hour rating of 216 kW. at 1,800 r.p.m., corresponding, with a gear reduction ratio of 1 : 2·64, to a track speed of 71·2 m.p.h., and a continuous output of 182 kW. at 1,940 r.p.m., or 77·5 m.p.h. Both the

A—Light weight pantograph. *B*—216 kW. traction motor for use in conjunction with individual axle drive. *C*—Switching group. *D*—Secheron individual axle drive as used with 35½-in. wheels. *E*—Brown Boveri tapless transformer of new design to give notchless control. *F*—Master controller; for running service only the potentiometer, with the contacts belonging to it, seen on the right, is used; all other contacts and slip rings are for the control of the electric brake. *G*—Circuit breaker.

ELECTRICAL EQUIPMENT OF THE SWISS FEDERAL RAILWAYS HIGH-SPEED TRAINS

Oerlikon and Secheron drives are developments of the existing systems of those two firms, and are suited specially to small wheel diameters. The Oerlikon system consists of cylindrical pieces, sliding one within the other and containing helical springs operating only under compression; the groups are held by a casting on the quill and drive through five equally-spaced hollow thrust blocks projecting from a disc forced on to the track wheel hub by hydraulic pressure. Links with spherical articulated joints are used instead of springs to take up the compression load in the Secheron equipment.

A system of control giving a smooth and continuous supply of current to the secondary winding of the trans-



1—Primary winding. *3*—Rolling contacts.
2—Secondary winding. *4*—Control motor.
5—Traction motors.

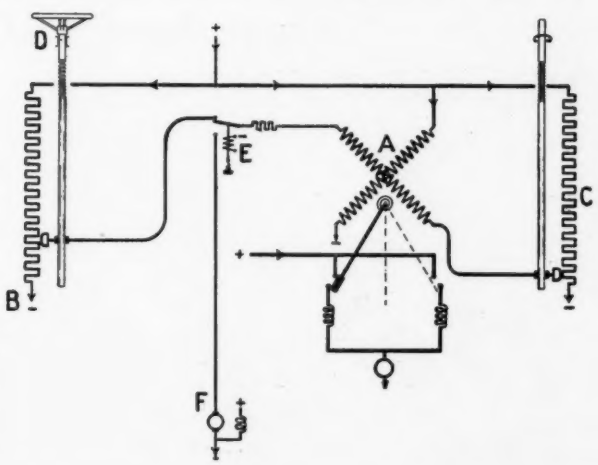
Transformer with tap-less voltage regulation

former, instead of the usual tap-changing method, has been evolved by Brown Boveri, and has a greatly simplified construction owing to the elimination of on-load contactors and step-transition choke coils which bridge over the interruption of current to the motors without eliminating current surges. Experience with the 7,000 h.p. locomotives on the Gothard line showed that switching apparatus without interruption of current, lodged in oil-immersed transformers, worked well, and called for little maintenance work, the step-switch, for example, being overhauled only once in three years.

Notchless Control

In the new system (see accompanying illustration), the primary *1* of the transformer is wound round the core, and the secondary *2* is wound over it, spirally, and concentric to it. There are rolling contacts *3* which run on the bare edge surface of the secondary winding and collect the current. These roller contacts are guided by the winding and are actuated by a carrier-piece driven by the motor *4*. As the voltage regulation is not controlled by taps, remote control of it is effected more simply. As may be seen in the second diagram on this page, there is a polarised relay *A*, one coil of which is branched between two potentiometers *B* and *C*, and the other on the lighting battery; the relay works on a change-over contact with a recall spring. When the sliding contact on the potentiometer *B* in the master controller is moved, through the switching forward of the controller, the coil branched between the two potentiometers is supplied with current until the contact of the potentiometer *C* on the drive of the transformer regulation has attained a corresponding position. The driving motor (*4* in the first diagram) of the voltage regulation system is controlled in the desired switching direction by the change-over switch of the polarised relay, and after the same voltage has been attained in both potentiometers, this motor is brought to rest again. If the sliding contact on potentiometer *B* is again displaced, the current direction in one of the coils in the polarised relay changes again, and causes the driving motor to move in the corresponding direction.

By a suitable choice of the gear ratio of the transformer drive, the handwheel *D* of the master controller can be carried to the end position immediately from starting. The voltage then increases progressively until the sliding contact on potentiometer *C* again attains the level of that on potentiometer *B*. To initiate instantaneous cutting out, the controller handwheel is brought straight back to the zero position, which immediately causes the driving motor switch to be actuated. At the same time, the regulating coil of the polarised relay is switched over, by the change-over relay *E*, from the potentiometer *B* to the small dynamo *F* driven from one of the coach axles. The voltage of this dynamo is proportional to the running speed of the coach, and changes the voltage of the transformer through the action of the control motor *4* (first diagram) bringing it to a value which allows the cut-out



A—Polarised relay. *D*—Controller handwheel.
B—Potentiometer in controller. *E*—Change-over relay.
C—Potentiometer on transformer. *F*—Axle-driven dynamo.

Remote control of tap-less transformer

of the traction motors without shock. There is a similar procedure after an application of the electric brake, the dynamo *F* ensuring that the transformer voltage is such as to permit of the immediate switching in of the traction motors at the prevailing speed. If the master controller had only to perform the duty of running control, and not also the braking control, which is in steps, it would comprise in principle only the incoming current lead and a commutator-shaped potentiometer.

P.O.-MIDI RAILWAY ELECTRIFICATION

Extracts from a paper read by M. Bachellery, Chef du Service du Matériel et de la Traction, before the Institution of Electrical Engineers, November 18

IN 1923 there was in operation on the Paris-Orleans Railway 28 km. (17½ miles) of suburban electrification on the third-rail 600 volts d.c. system, and on the Midi Railway 55 km. (34 miles) of third-rail 850 volts d.c.; 46 km. (28½ miles) of 12,000 volts single-phase; and 179 km. (111 miles) of 1,500 volts d.c. with overhead contact line. The last-named system was standardised, and today on the combined P.O.-Midi Railway there are 2,518 route km. (1,565 miles), comprising 5,524 track km. (3,438 miles), electrified on that system. The electrification covers nearly the whole of the mountain lines in the Pyrenees, including two trans-Pyrenean routes with grades as steep as 1 in 25, but recent conversions have been mainly on lines with heavy traffic where a high coal consumption per mile of route has permitted sufficient economy to make electrification a paying proposition.

The energy consumption in 1936 amounted to 470 million kWh., corresponding to an economy of coal on the locomotives of more than a million tons. The energy is produced mainly in hydro-electric plants belonging to the P.O.-Midi or to allied companies, but part is drawn from steam power plants. The P.O. owns two hydro-electric plants with a capacity of 152,000 kW. located in central France, and the Midi owns seven plants with an installed capacity of 135,000 kW., located in the Pyrenees. The annual production is over 900 million kWh., and the surplus is sold for use in industry or for public consumption. The two generating systems are separate at the moment, but are to be connected.

Mercury-arc rectifier substations have been used on the Midi system since 1923, and the five equipments then installed are still giving great satisfaction. Subsequently, 23 further rectifier stations have been erected on the Midi system and four are to be used on the Tours-Bordeaux line, now being converted. Over 60 substations on the combined P.O.-Midi Railway are controlled automatically as to the converting plant and d.c. feeders; the connections between the substations and e.h.t. lines are always manual. On the Midi sections the catenary is made up of a steel messenger cable, an auxiliary messenger, and a contact wire, the second and third cables being of grooved copper with an aggregate area of 0·155 sq. in. In the latest applications the copper section has been increased to 0·24 sq. in. On the P.O. lines the messenger cable is of bronze, of 0·18 sq. in. section, and it supports an auxiliary messenger of 0·16 sq. in copper, from which two copper contact wires of similar section are alternately suspended by loose hangers in order to eliminate hard spots.

The combined railways own 638 electric locomotives and 152 motor-coaches. There are 102 fast passenger locomotives, and all except ten 2-Co-2 engines built for the Midi in 1925 are of the 2-Do-2 wheel arrangement. There are 521 locomotives of the Bo-Bo type with one-hour capacities varying from 1,400 to 1,800 h.p. and weights of 72 to 80 *tonnes*. Those working on the Midi, where the grades are steep, have either rheostatic or regenerative brakes. The shunting locomotives are 15 in number, and they have recently been rebuilt with metadyn control. [*See* issue of this Supplement for April 30 last.]

THE DYNAMICS OF AXLE-HUNG MOTORS

DISCUSSING the vertical blows on the rails produced by vehicles with nose-suspended motors, due to irregularities in the track and rail joints, Mr. H. G. McClean, the Chief Engineer of Crompton, Parkinson & Co. Ltd., in his paper* read before the Institution of Locomotive Engineers on November 24, presented the accompanying table to show the blows given at high speed by various electric and diesel-electric vehicles. The value of the blow, $\frac{MuV^2}{D}$, as given in the table, is adapted from Furrer's investigations, published in the *Schweizerische Bauzeitung* of February 12, 1927, in which it is used in conjunction with a constant. The above expression, in which Mu is the unsprung mass per axle in lb., V is the speed in m.p.h., and D is the diameter of the road wheel in inches, is assumed to represent a " unit of blow " to facilitate comparison with existing applications of nose-suspended motors and to estimate the effect of proposed designs. It is shown in the paper how greatly the magnitude of the vertical blow may be reduced by the introduction of resilient gear wheels in place of the normal solid type, this reduction averaging 20 per cent. with motor-coaches and high-speed trains, and up to 25 per cent. with heavy locomotives. The magnitude of the blow and the equivalent unsprung mass of the motor are discussed in the light of the investigations of Carter, Laternser, Furrer, and Brecht.

* The Hammer-Blow with Axle-Hung Electric Traction Motors

HIGH-SPEED APPLICATIONS OF THE AXLE-HUNG MOTOR

Railway Vehicle	French State Stainless steel electric train	German State E.05 1-Co-1 electric locomotive	German State 1,200 b.h.p. three-car diesel electric train	Union Pacific " City of San Francisco " diesel-electric train	B. & O. 3,600 h.p. diesel-electric locomotive	C.B.Q.R.R. Denver Zephyr diesel-electric train
Weight of motor, excluding gear and case	2,920 lb.	11,250 lb.	4,500 lb.	4,850 lb.	6,250 lb.	6,190 lb.
Equivalent unsprung weight	1,720 lb.	3,600 lb.	2,650 lb.	2,860 lb.	3,680 lb.	3,650 lb.
Type of gears	Rigid	Flexible	Rigid	Rigid	Rigid	Rigid
Weight of wheels, axles, axleboxes, gears and case	3,650 lb.	5,200 lb.	3,240 lb.	2,950 lb.	3,550 lb.	3,000 lb.
Total unsprung weight	5,370 lb.	8,800 lb.	5,890 lb.	5,810 lb.	7,230 lb.	6,650 lb.
Wheel diameter	37½ in.	55 in.	39·3 in.	36 in.	36 in.	36 in.
Maximum speed	85 m.p.h.	81 m.p.h.	100/124 m.p.h.	100 m.p.h.	100 m.p.h.	100 m.p.h.
Blow, $\frac{Mu\ V^2}{D}$	103×10^4	105×10^4	150×10^4 at 100 m.p.h. 230×10^4 at 124 m.p.h.	161×10^4	201×10^4	185×10^4

RECTIFIER WORKS AT BIRMINGHAM

AMONGST the latest and most important additions to the General Electric Company's Witton works, established in 1902, and available for inspection on the occasion of the recent press visit (*see* THE RAILWAY GAZETTE for November 26) were the separate and self-contained steelclad rectifier works, a high-power testing laboratory, battery works, mechanised foundry, and a moulded insulation works.

It is in the new rectifier shops that the G.E.C. pumpless air-cooled steel tank rectifier is manufactured in its commercial form in sizes corresponding to a current range of 350 to 700 amp. for voltages up to 800. For voltages up to 1,500 and 3,000, rectifiers up to 1,000 kW. capacity are produced as single units, and larger sizes are being developed. A range of six and twelve anode rectifiers is made for currents of 1,000 amp. and over, and capable of meeting all the usual requirements up to tensions of 4,000 volts. A typical installation of the G.E.C. pumpless rectifier is to be found in the Hammersmith substation (trolleybus) of the London Passenger Transport Board, where there are two twin-cylinder 500 kW. 600-volt rectifiers in operation. A total of 23 similar rectifier cylinders are in service on the system of London Transport. It is the development of a special design of vacuum seal for the rectifier anodes which has made possible the pumpless unit.

With the exception of the production of castings and the fabrication of the largest sizes of tanks used for water-cooled rectifiers, all the manufacturing and testing work on G.E.C. rectifiers is done in the new extension at Witton works. The units are partially assembled on special jigs and are then taken into a dust-proof mercury filling room, where the final stages of assembly are carried out. Here the anodes, which are made in a separate dust-proof shop, are mounted in the rectifier assembly.

The testing plant occupies a large proportion of the rectifier extension, and includes two big motor-generator sets, each consisting of a synchronous machine directly coupled to two d.c. machines and a variable speed driving motor. The two sets may be operated independently of each other or electrically coupled together, and in the latter case the four d.c. machines may conveniently be interconnected so that a continuous output of 6,000 kW. is obtainable at 900, 1,800 or 3,600 volts.

Three large rectifier transformers are provided, and have a total capacity of 16,500 kVA. The largest single unit, which is rated at 9,000 kVA., is suitable for testing 900, 1,800 or 3,600-volt rectifiers and inverters at full capacity, and may be connected either fork or double three-phase, a separate interphase transformer being provided for use with the latter connection. In addition to a number of equipments for the treatment of air-cooled pumpless rectifiers, the plant includes two heavy-current low voltage transformers together with variable resistance loads and switchgear for the de-gassing of large rectifiers.

A prominent feature of the plant is the two switchgear galleries, each of which extends practically the whole length of the test room. On one of these is mounted a switchboard whereby the primary of any transformer may be fed from any available supply. On the second gallery are a total of forty-eight 1,250-amp. busbars and jumper connections by means of which the anode terminals of any transformer may be connected to any test bed, thus economising in time and eliminating temporary wiring

Rush hour in the G.E.C. rectifier testing station at Witton works

when changing from the de-gassing to the testing equipments. All switches, cubicles and the like are interlocked to prevent danger of electric shocks and arcs.

When testing rectifiers the synchronous machines operate as alternators, energising the primary windings of the rectifier transformer which feeds the rectifier undergoing test. The d.c. output of the rectifier is fed back to the d.c. machines, thus circulating the bulk of the power, whilst the driving motor compensates for the losses of the entire system. Inverters are tested in a similar manner, but in this case the synchronous machines operate as motors and the d.c. machines as generators. By means of an arrangement wherein alternate anodes are energised by a rectifier transformer and the remainder by a low-voltage heavy-current transformer, a 12-anode rectifier may be tested at continuous outputs up to 12,000 kW. or two separate units tested independently at half this value when required.

NOTES AND NEWS

Pennsylvania Electrification.—Such rapid progress has been made with the conversion of the tracks of the Pennsylvania Railroad between Paoli and Harrisburg, 83 miles, that this division is expected to be turned over to electric operation early in 1938.

Success of Longer Tube Trains.—After a fortnight's trial, the L.P.T.B. considers that the nine-car trains carrying over 1,000 passengers on the Morden-Edgware line have been so satisfactory that further trains may be added. To meet the difficulty of short platform lengths, the last two cars are reserved for passengers to Tottenham Court Road station, and remain in the tunnel at the previous stations.

Swiss Private Electrification.—The standard-gauge Süd-Ost Bahn (South-Eastern Railway), a small system between the lake of Zurich and the Gotthard route, is shortly to be electrified on the 15,000-volt single-phase system, with financial assistance from the Government and from the cantons concerned. Running times will be greatly reduced and through connections improved. Particulars of this line, with a map, were given on p. 10 of the January 3, 1936, issue of THE RAILWAY GAZETTE, when its probable conversion was announced.

American Service Discontinued.—Passenger service over the electrified tracks of the New York, Westchester & Boston Railroad, a former subsidiary of the New York, New Haven & Hartford Railroad, between New Rochelle and Port Chester was discontinued on and from November 1. This nine-mile line is closely paralleled by the electrified tracks of the N.Y., N.H. & H.R.R., which gives a direct service to the Grand Central station in New York. Under an order of the receivers, service over the remainder of the line between the Bronx terminal and New Rochelle and White Plains will be maintained only until the end of the year.

Electric Locomotives for New Zealand.—Among the work in progress seen at the Preston works of the English Electric Co. Ltd. on the occasion of the press and engineering visit some little time ago, was one of the two 2-Do-1 electric locomotives for the 1,500 volts d.c. system of the New Zealand Government Railways in North Island. The mechanical portions of these two 3 ft. 6 in. gauge locomotives were built at the Forth Banks works of R. & W. Hawthorn, Leslie & Co. Ltd. Four 310 h.p. totally-springborne motors, arranged in two groups of two motors coupled permanently in series, are used, and the electro-pneumatic control gear is arranged for multiple-unit control. Individual axle drive is used to transmit the motor torque to the wheels. The locomotive weight is about 84 tons and the top service speed 60 m.p.h.

Electric Stock for South Africa.—The Birmingham Railway Carriage & Wagon Co. Ltd. has received orders from the South African Railways & Harbours Board for eight third class electric motor-coaches, type T42M, and four first class electric motor-coaches, type L63M, required for the Cape suburban electrified lines. The English Electric Co. Ltd. is to supply the electrical equipment. In addition, the International General Electric Co. Ltd. has received orders from the South African Railways & Harbours Board for a total of 15 electric motor-coaches, of which the Metropolitan-Cammell Carriage & Wagon Co. Ltd. is to build nine third class (type S38M) and the Birmingham Railway Carriage & Wagon Co. Ltd. is to build six first, second and van composites (type U37M). Ten of the above coaches are for service in Natal and the remaining five are for the Reef electrification.

L.N.E.R. Electrification Contracts.—Contracts have been placed with British Insulated Cables Limited, of Prescot, Lancashire, for the overhead line equipment required for the Manchester—Sheffield line and the Great Eastern section conversion schemes of the L.N.E.R., to the total value of over £1,000,000. These two contracts include the design, manufacture and erection of the complete overhead line equipment on the Manchester—Sheffield line and the branch line to Wath-upon-Dearne (a total of 75 route miles), and also that required for the suburban lines from Liverpool Street and Fenchurch Street stations to Shenfield, a distance of 25 route miles. The single track mileage involved amounts to 300 and 100 respectively. The electrifications are to be on the 1,500 volts d.c. system, and it is estimated that the two present contracts will require about 8,500 tons of steelwork and 3,000 tons of copper. The expected time for the completion of erection is 2½ to 3 years.

Warsaw Electrification Results.—Under the heading "We Prefer Electricity to Steam," the *Express Poranny*, of Warsaw, has published the following note on the increase of passenger traffic since the electrification of the Warsaw suburban railways, by the English Electric Co. Ltd. and the Metropolitan-Vickers Electrical Co. Ltd. The Polish State Railways' statistics show that since the electric trains have been put into service the number of passengers carried on the Zyrardow line has increased by 25 per cent. above the average figure and on the Otwock line by 100 per cent. The results are above expectations, the Polish State Railways management having expected the passenger traffic to rise about 15 per cent. The development of the Warsaw suburbs is due partly to the electrification of the Warsaw cross-city railway junction line. The journey from Warsaw to Pruszkow is now shorter than that from the centre of Warsaw to Zoliborz. It is to be expected that in the course of the next ten years, close connection of the suburbs to the centre of the city will make them an extension of the city itself, in the same way as the suburbs have become around Berlin.